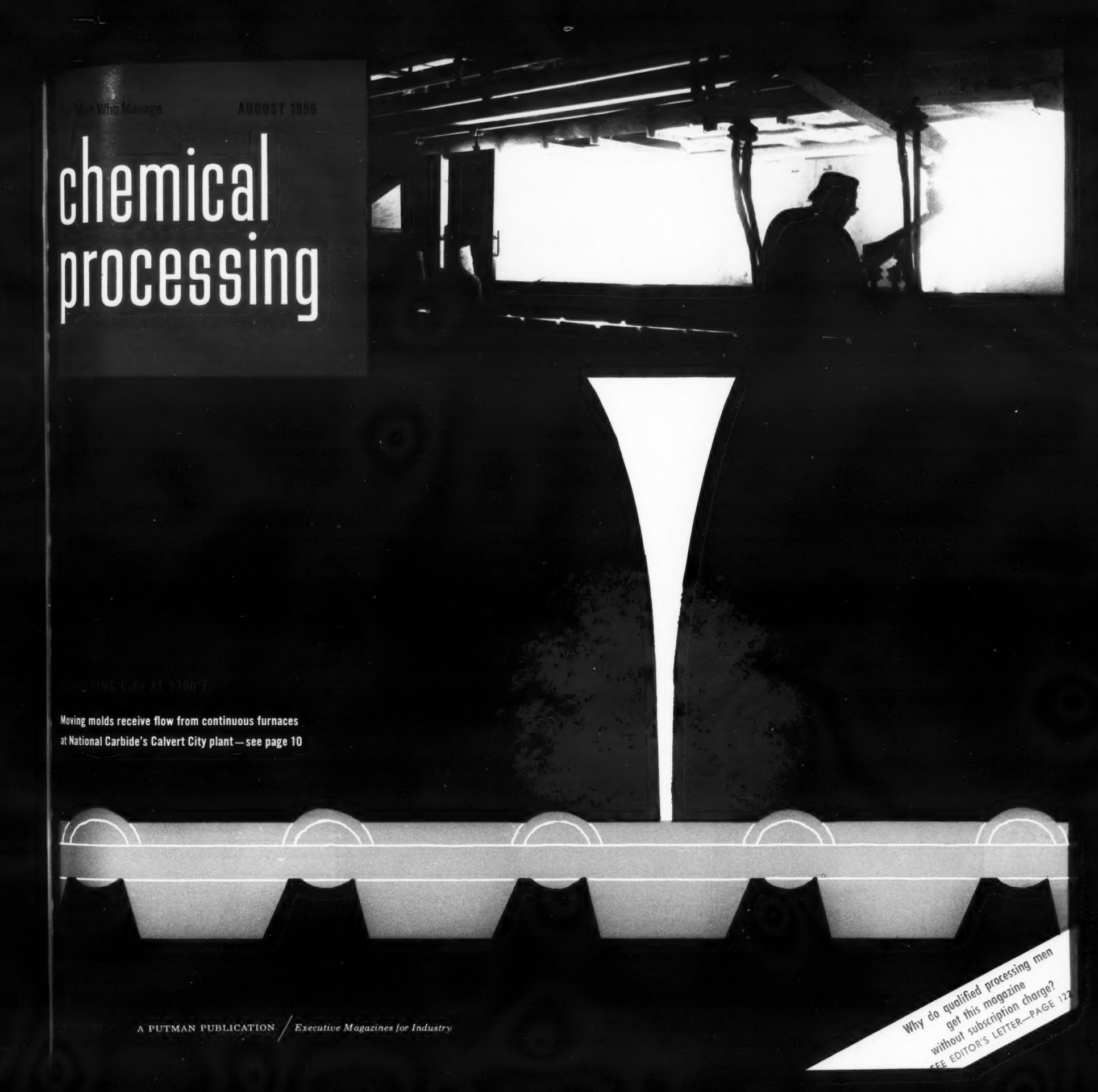
Men Who Manage AUGUST 1956

chemical processing



Moving molds receive flow from continuous furnaces at National Carbide's Calvert City plant—see page 10

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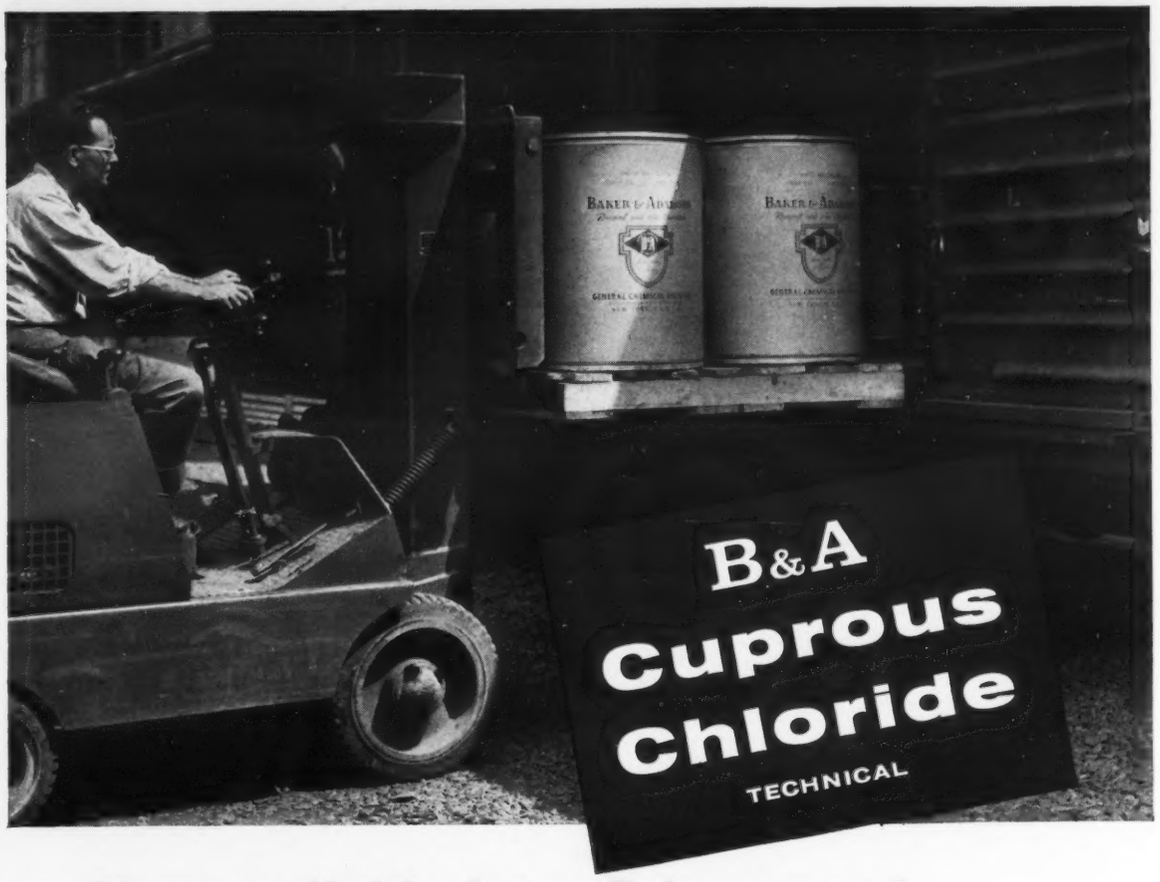
Why do qualified processing men get this magazine without subscription charge?
SEE EDITOR'S LETTER—PAGE 12

PLUS ONE To Grow On



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Assay (CuCl)	95% min.
Insoluble in HCl	0.05% max.
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Screen Size:

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SETTING THE PACE IN CHEMICAL PURITY SINCE 1882

When inquiring check 6812 opposite last page

THAT'S INTERESTING

A well comes in — Hollywood style

There is a section of Texas where oil has never been found — strange as it seems. Stranger still was the old wooden oil rig that seemed to be spouting oil in this very section.

The rig was part of the motion picture, "Giant"; the oil an authentic-looking blend of water, a neutral wettable lamp black for coloring, and a water-soluble thickening agent. Mixture was developed by Dr. Myers, of the Motion Picture Research Council, and technicians of B. F. Goodrich Chemical Co., who supplied the thickening agent.

Some 15,000 gallons of synthetic oil were pumped, at the rate of 2200 gpm, over 65 feet into the air. Resulting gusher was convincingly black, of uniform body, non-toxic, and with a viscosity similar to crude oil.

Ouch? — not any more

Dissolve one "pinch" of diatomic iodine in a bucket of water. That's the recipe for an effective germ killer that will not harm skin tissue. Thus no "burn".

> **Only 0.03% solution of two-atomed iodine is an effective disinfectant. In conventional iodine solutions metallic salts are added in an attempt to dissolve up to 5% iodine. Result, greater iodine absorption but also painful burn.**

Prof. Michael Iannarone, of Rutgers University, has been using his own mouth as a proving ground for the new iodine solution. It is non-specific and will kill all types of germs (*Oil Paint and Drug Reporter*).

Skiing—on plastic

To follow up on the plastic ski—comes plastic snow. Jacques A. Brunel of Beacon, N.Y., has proposed a chute covered with artificial snow composed of a layer of raw cotton six to eight inches deep, and a layer of plastic about two inches thick. The top layer is described in patent 2,742,288 as plastic material, plastic shavings, scrap or celluloid flakes, mica or fiber-glass. Artificial snow permits a skier to execute all movements that are possible on the real thing. Beams set across the chute at spaced intervals keep the cotton from sliding downhill. (*New York Times.*)

(*Please turn to page* 203)

chemical processing

with which is combined
CHEMICAL PROCESSING PREVIEW
and Chemical Business

for men who manage

Vol. 19 August 1956 No. 8

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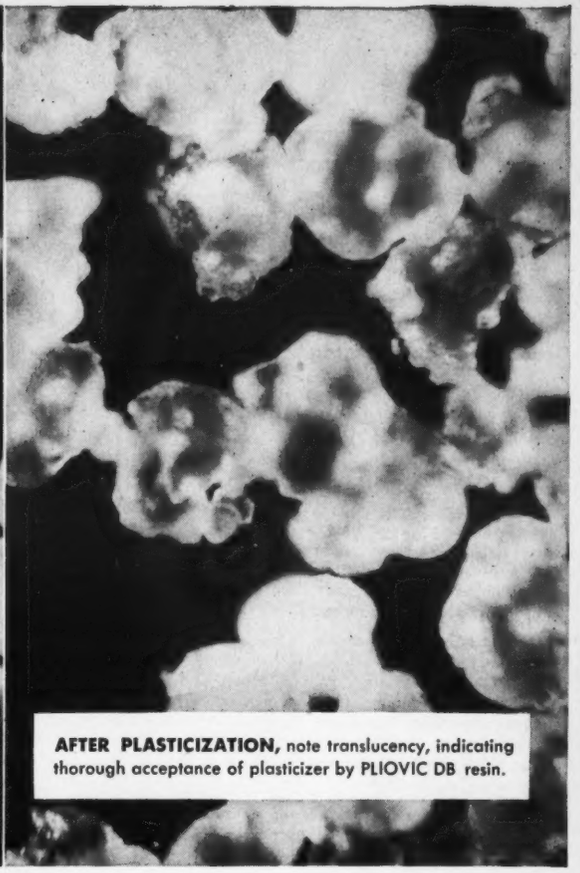
BEFORE PLASTICIZATION, note porous structure of particles of PLIOVIC DB resin.



AFTER PLASTICIZATION, note translucency, indicating thorough acceptance of plasticizer by PLIOVIC DB resin.

Answer to an absorbing problem

PLASTICS DEPARTMENT

When it comes to dry blending resins, the problem is to produce a resin which accepts plasticizer at a rapid, yet uniform rate. It also must give a sandy, free-flowing mix, must process easily on any type of forming equipment, and must do so at no sacrifice of physical properties.

In developing such a resin, Goodyear made careful studies of resin particles at various stages of blending. These indicated that plasticizer is first absorbed as a thin layer on the particle surface. Then, as heat is transferred to the particle, this layer moves inside or is absorbed. Also established was the importance of particle size, shape and porosity.

Pictured at right is one result of these studies–particles of a typical PLIOVIC DB (dry blending) resin under magnification. It is a resin which is quickly plasticized, processes readily, exhibits excellent physical properties–permits you to take safe advantage of the speed and low cost of dry blending. For details plus the latest *Tech Book Bulletin*, write to:

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Over the editor's shoulder

Greenewalt on planning

On June 7-9, 1956, over 700 men of the chemical industry attended the 84th annual meeting of the Manufacturing Chemists' Association, Inc.

Each year this group meets at the Greenbrier, White Sulphur Springs, West Virginia, in an informal meeting. Some time is devoted to a general business session and the rest of the time is occupied by swimming, golf, tennis, other outdoor activity, and "conversation" about many facets of the industry.

In the general business session, Crawford H. Greenewalt, President, E. I. du Pont de Nemours & Company, Inc., gave a remarkably concise, astute, and interesting presentation of a most important immediate question. He sounded a strong note for the future in his optimistic approach to long-range planning versus short-range planning.

Not only did he reflect a note of optimism — but in that talk reminded us of the importance of developing the ability to express one's self well. His talk was well prepared and, characteristically, excellently delivered.

In September CHEMICAL PROCESSING you will see a reprint of that talk . . for we believe that all scientific people will want to read it, not only for its message, but also as an example of a well prepared and written speech.

When you read that talk we're sure that you'll understand why it is important for technical men to understand the need to express one's self well in speech as well as writing. Selling one's ideas can be wholly dependent upon this ability to "self express."

We urge that you read Crawford Greenewalt's talk next month.

John C. Vaaler

Editor

- For more information on articles and advertisements in this issue, check the Reader Service slip opp. last page
- The product directory, pages 193 to 196, is your guide to all articles and advertisements
- To subscribe to this magazine, see reader-qualification form opp. last page

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THIS MONTH'S COVER

. . . shows continuous calcium carbide furnaces being tapped at National Carbide's Calvert City, Kentucky, plant. Complete material handling system — from raw materials to finished carbide — is described in story starting on page 10 of this issue.

August 20-31. Massachusetts Institute of Technology, Summer Program on Molecular Engineering, Cambridge.

August 21-24. Western Electronic Show & Convention, Pan Pacific Auditirium, Los Angeles.

September 5-7. National Agricultural Chemicals Association, Annual Meeting, Essex and Sussex Hotel, Spring Lake, N. J.

September 8-12. American Institute of Chemical Engineers, William Penn Hotel, Pittsburgh.

September 10. American Assn. of Textile Chemists & Colorists, Perkin Centennial, Waldorf-Astoria Hotel, New York City.

September 11. American Chemical Society, Minneapolis.

September 11. Synthetic Organic Chemical Manufacturers Association monthly luncheon, Roosevelt Hotel, New York City.

September 16-21. American Society for Testing Materials, Pacific Area National Meeting and Apparatus Exhibit, Statler Hotel, Los Angeles.

September 17-22. 11th Annual Instrument-Automation Conference and Exhibit, Instrument Society of America, New Coliseum, New York City.

September 23-25. Drug, Cosmetic and Sunday Show, Pharmaceutical Council of Greater New York, Statler Hotel, New York City.

September 24-28. Trade Fair of the Atomic Industry, Navy Pier, Chicago.

September 27-29. Drug, Chemical and Allied Trade Section, New York Board of Trade, Annual Outing, Pocono Manor Inn, Pocono Manor, Pa.

October 1-3. 12th Annual National Electronics Conference, Hotel Sherman, Chicago.

October 1-5. American Institute of Electrical Engineers, Fall General Meeting, Morrison Hotel, Chicago.

October 3-4. Eleventh National TAPPI Plastics-Paper Conference, The Institute of Paper Chemistry, Appleton, Wisc.

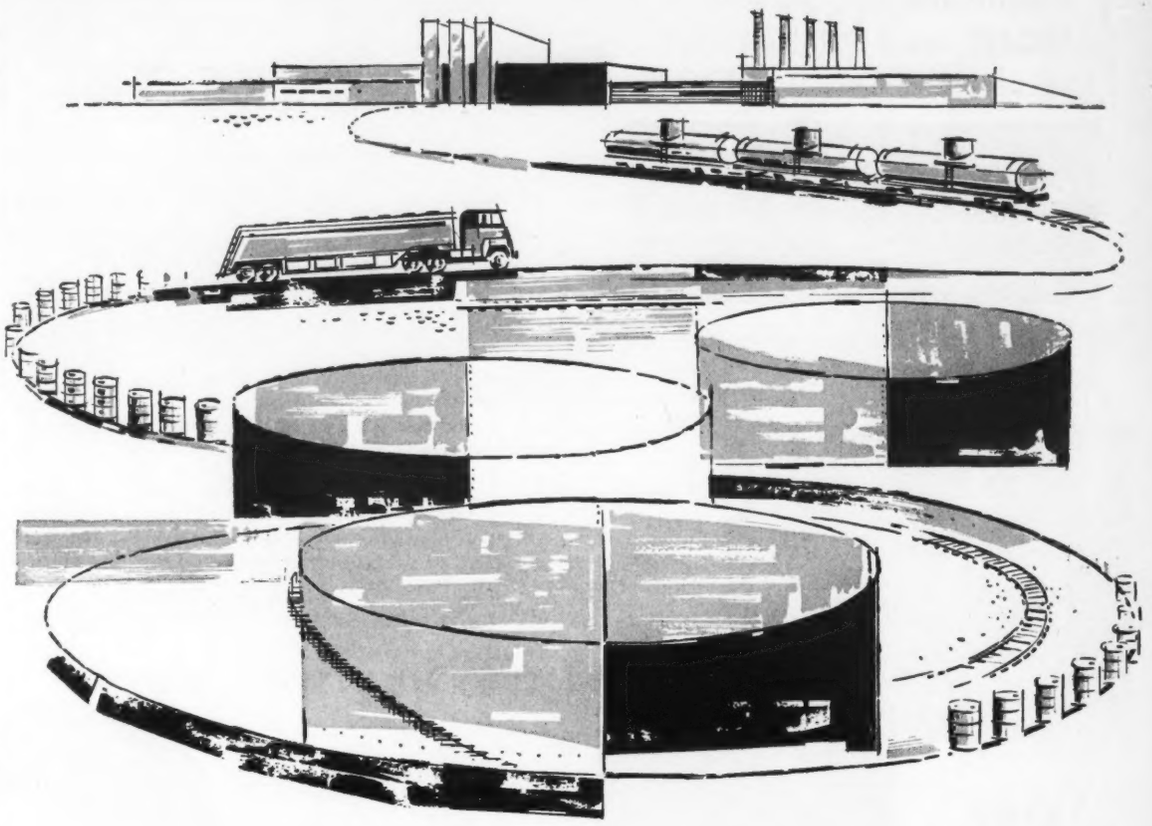
October 11-12. The Society of the Plastics Industry, Inc., New England Section Conference, Wentworth Hotel, Portsmouth, N. H.

October 15. Salesmen's Association of the American Chemical Industry, Sales Clinic, Commodore Hotel, New York City.

October 21-24. Federation of Paint and Varnish Production Clubs, Annual Meeting, Cincinnati, Ohio.

October 22-26. 44th National Safety Congress and Exposition, Conrad Hilton Hotel, Chicago.

November 27. 9th National Chemical Exposition, Public Auditorium, Cleveland.



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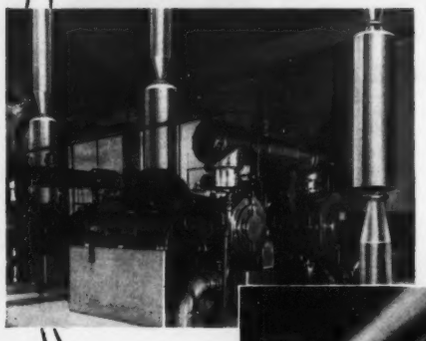
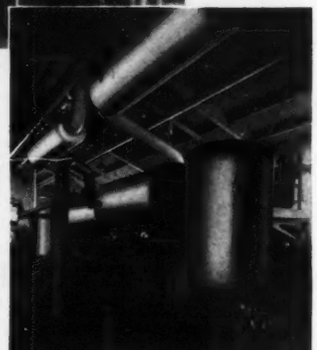
The Burgess-Manning Snubbing principle . . . when engineered to your problem is guaranteed to

STOP NOISE — from intake or discharge of air, steam or gas from engines, compressors and vacuum systems, and



STOP PULSATION from surges created by compressors, pumps, blowers and pressure reduction systems.



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We invite you to submit your problems for recommendation.

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TAKE THE LONG VIEW

JOHN L. GILLIS,
Monsanto Chemical Company

As we watch the chemical industry grow, as we see the markets become more competitive in spite of an upsurge in demand, it becomes more and more apparent that we must turn to intelligent, long-range planning in order to keep pace.

Time and time again the question is asked . . . "Why spend the substantial amounts of time and effort required to make long-range forecasts . . . then base plans on these forecasts when you know that in most cases they will be grossly in error?"

The chemical industry is characterized by high capital costs per sales dollar. With such costs, plants must usually operate at high rates to produce satisfactory profits. As products are superseded by new products, ever increasing amounts are being spent for research. All this requires careful planning of plant capacity to achieve maximum return on new capital.

Let's look at some of the ingredients that go into successful planning. First, a keen top-level interest and appreciation for its value is a must. Even though a planning program is carefully thought out

Mr. Gillis was graduated in 1933 from Washington University, St. Louis, Mo., with a BS degree in Business and Public Administration. He joined Monsanto at St. Louis as Assistant Export Manager. He held various positions in the company's export operations and in 1946, was made Director of the Foreign Department.

He became a vice president in 1950, was placed in charge of all Monsanto marketing functions in 1953 and, in 1955, was elected to Monsanto's Board of Directors.

Mr. Gillis spent several months overseas in 1944 on a joint economic mission to North Africa, the Middle East and Italy for the Department of State, Department of Commerce, and the FEA. He is a director and member of the Executive Committee of the MCA and is active in civic and educational projects in St. Louis.

and developed, it can fail unless top management consistently improves the planning work and constantly checks and evaluates the program's progress.

It's also important that this top group have the necessary time to devote to planning. And just the opportunity is not enough — they must conceive the planning function as a major part of their job.

Too, it is necessary to have a focusing operation where the voluminous amounts of written and verbal information from both internal and external sources are screened, analyzed and condensed into a picture which is meaningful to the specific interests of your company. The presentation of this information and analysis is the kick-off point for the long-range planning operation.

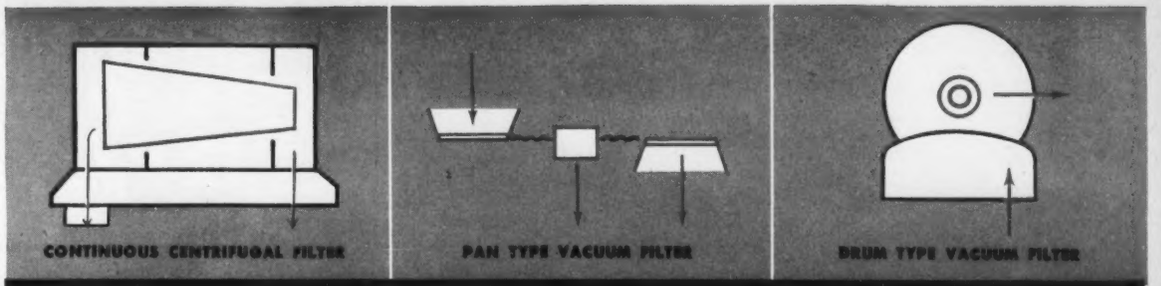
Broad objectives should be developed *in writing*, and distributed down through the organization so far as security permits. By broad objectives I mean such things as sales and profit goals, a statement of the areas in which the company is interested in basing its future growth, and the "rules of the road" for reaching these objectives.

The thinking process and collection of information necessary to developing plans on paper has tremendous intrinsic value in forcing the entire organization to learn more about its business and think through its problems. And more important, it provides the base from which progress can be measured.

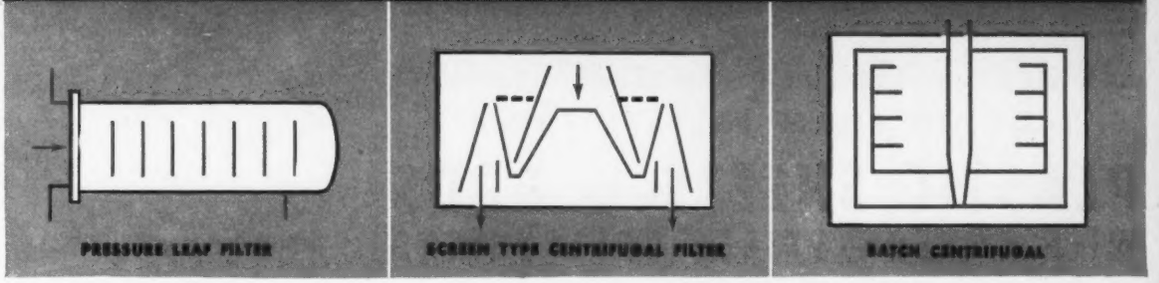
WHERE do we plan?

Financial planning is probably the area that receives most attention in the chemical industry. This is only natural for an industry that is growing rapidly and that requires relatively large amounts of capi-

(*Please turn to page* 191)



When the flow sheet says FILTER



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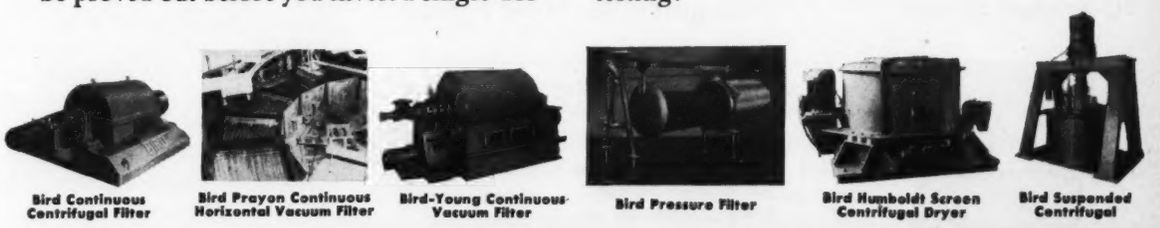
Bird Continuous Centrifugal Filter
Bird Prayon Continuous Horizontal Vacuum Filter
Bird-Young Continuous Vacuum Filter
Bird Pressure Filter
Bird Humboldt Screen Centrifugal Dryer
Bird Suspended Centrifugal

BIRD

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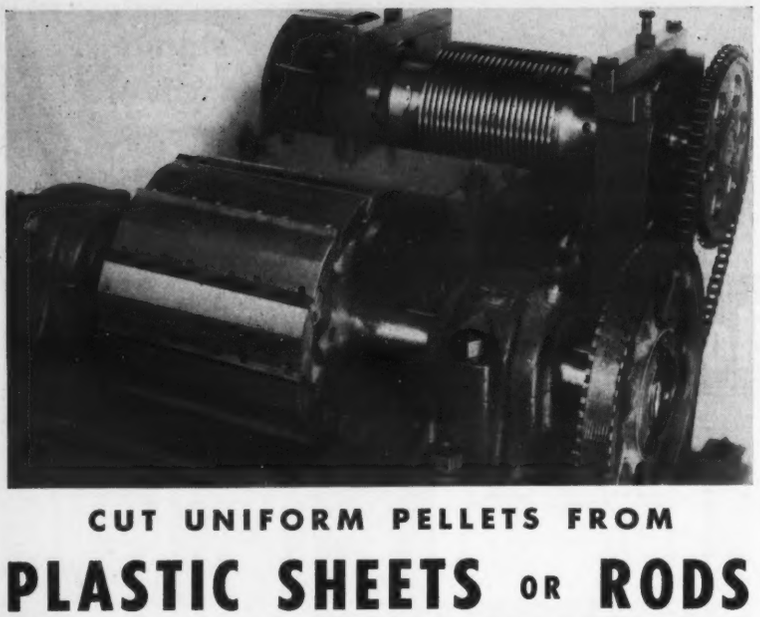

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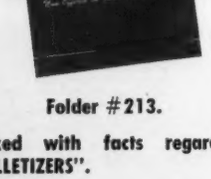

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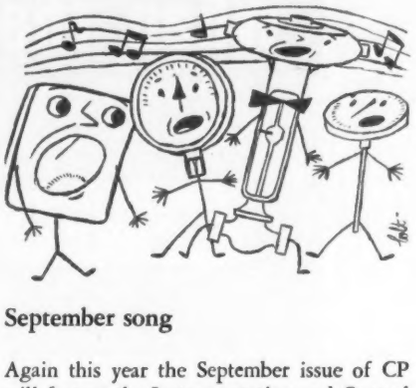
looking ahead to next month . . .



September song

Again this year the September issue of CP will feature the Instrumentation and Control section. In addition to feature articles about instruments at work, there'll be a roundup of new instrument developments of the past year and a set of engineering data. Rotameters, manometers, and pressure conversion come under the guns of our "nomogramaniacs" this time.

Among other feature instrument stories you'll find . . .

Sulfur through a meter

Sulfuric acid makers have long looked for a simple, dependable method of checking sulfur consumption. The U. S. Rubber plant at Joliet, Illinois, arsenal (they make sulfuric acid under contract) has come up with the answer. Using a special-design nutating disc meter, steam-jacketed to maintain a temperature of 270°F, the plant has metered 30 million pounds of sulfur since installation, without trouble.

Performance and installation details were checked by Associate Editor Bruce Fader during a visit to Joliet last spring.

Another instrument case-history . . .

"The Case of the Cracked Headers"

The Whiting (Ind.) plant of Union Carbide and Carbon ran into trouble with three high-pressure boilers. Despite precautions, it was found that cold water headers in the boilers were developing cracks. Carbide applied its long-established non-destructive testing program to the problem. Using ultrasonic procedures developed through experience, Carbide engineers were able to test and return the boilers to a safe condition with a minimum of lost time.

Associate Editor Bruce Fader worked with Frank C. Parker, Senior Engineer of UCC's testing group, in gathering the story.

Push button production of water-treating compounds

Completely automatic handling and mixing system for dry powder at Dearborn Chemical's new plant at Lake Zurich, Ill., can put out 98 million pounds of water treating compounds annually, with only nine operators and seven maintenance people. Previously, at the old plant, 65 operators and 8 maintenance men were required for only 32 million pounds a year.

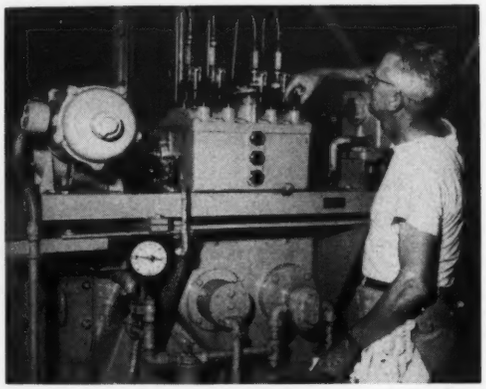
What's the new system like? CP editors Dana Berg and Ted Wett made a trip to Dearborn and, in September's Material Handling section, describe the pneumatic installation for you.

Picture shows (l to r) Assistant Plant Manager Sam Kruty, Plant Manager Lester Sagar, and CP Managing Editor Dana Berg going over prints of the new operation.

Here's a quick preview
of features you'll find
in September CHEMICAL PROCESSING

Lubrication against 15,000 psi

When Mississippi Chemical Company in Yazoo City, Miss., went on-stream with its new synthetic ammonia plant in 1951, one of the biggest problems was lubrication on the ammonia recirculators. Operating against 1000 atmospheres, the units developed leaks, cams and shafts jammed or broke, and flow of lubricant to working parts became sporadic and unreliable.



After considerable research, a lubricator was developed that would do the job. Maintenance was cut by 99 percent . . . units ran for a year with no trouble whatsoever.

Assistant Editor Ted Meinhold visited MCC, talked to W. B. Dunwoody, plant manager, and brought back the story you'll find in next month's New Solutions section.

High-purity rosins by "flash" process

Requiring only a five-minute pass under high heat to separate turpentine and rosin from gum, new process used by Pine Chemicals produces high-purity, highly active rosins for use in paper, paint and varnish, as well as linoleum, printing inks, soap, and rubber.

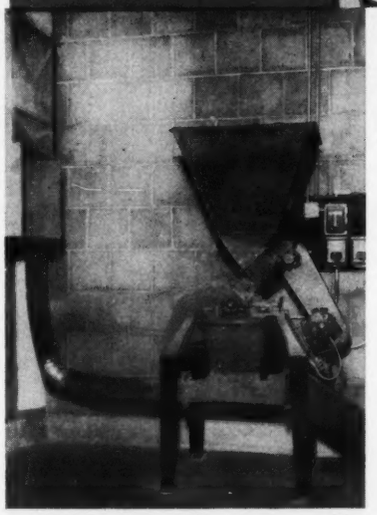
Rosin produced by the process is changed very little from its natural state. Abietic acid — resulting from overexposure to heat has little chance to form.

In the September Materials section you'll find a step-by-step description of the process and the resultant rosins.

A smoother operation for a smooth throat-saver

Ducts bringing pulverized material to two MIKRO COLLECTORS, each with its individual storage bin to hold material for following processing step.

MIKRO-PULVERIZER grinding materials for Pine Bros. Cough Drops at Life Savers Corporation, Port Chester, N. Y.



437

For many years Pine Bros. Cough Drops have been well-known on the counters of many a store throughout the country— —where the attractive display of their various flavors has offered a smoothing, soothing treatment for the person with a tickly throat.

Today, several processing steps of this division of Life Savers Corporation, have likewise been smoothed out. For here, a brand new MIKRO-PULVERIZER has been installed feeding to two likewise new MIKRO-COLLECTORS.

The problem was one of pulverizing, conveying and providing storage of the ground material of the two MIKRO-COLLECTORS. In this way, material is ground at the rate of 2,000 lbs. per hr. and conveyed a distance of 55 feet to the storage area. Conveying and storing is remotely controlled by means of solenoid valves run by one man at a control panel.

This permits a comparatively short grinding period to store up ample material for the day's operation in the mixers, the next processing step. In addition, a much cleaner pulverizing operation has resulted, with the use of considerably reduced manpower.

If smoothing out and improving a ticklish problem in your operation is in order— a call to the MIKRO Laboratory is a simple first step to arrive at the proper answer. Here, your problem is carefully analyzed—the resulting recommendations can be your guide to a smoother, more profitable operation.

SEND FOR your copy of Bulletin 55, describing the workings of the MIKRO Laboratory, and the MIKRO Test Grinding Data Sheet.

Mikro-D

PULVERIZING MACHINERY DIVISION
METALS DISINTEGRATING COMPANY, INC.
60 CHATHAM ROAD **SUMMIT, NEW JERSEY**

PULVERIZING • AIR C NVEYING DUST COLLECTING EQUIPMENT

When inquiring check 6818 opposite last page

New continuous production furnaces at National Carbide's Calvert City, Kentucky, calcium carbide operation required continuous draw-off of product. Probably the "hottest" conveying system in use enables National Carbide to . . .

HANDLE CaC_2 AT 3700°F— WITH CONVEYORS

At the Calvert City plant of National Carbide Company, a Division of Air Reduction Company, Incorporated, four huge rotating electric-arc furnaces fuse coke and high-grade lime into calcium carbide. The rotating furnaces, first of their kind in the United States, are of Norwegian design (by Elecktrokemisk A/S) and produce better than 200 tons per day each. Continuous production process is a radical departure from batch furnace process used by National Carbide at three other producing locations.

Handling Raw Materials

Rotating furnaces form product, in vicinity of electrodes, by chemical reaction of the raw materials in the intense heat of the electric arc, where temperatures of 4000 degrees Farenheit and higher occur. Efficient furnace operation depends on continuous feed and draw-off of material. Raw material feed rate demanded by furnace is maintained by vibrating feeders, discharging weighed amounts of coke and lime to a circular-path bucket conveyor on one of the Calvert City furnaces. Conveyor rotates continuously and carries material until it passes over a chute which requires charge. It then automatically discharges until the chute is chock-full. On the furnace there are nine chutes, each of which has a counterweighted arm that trips the bucket as the charge is required.

As the empty buckets return to the loading point, another counterweight device actuates switch to start feeder and refill them. In this manner, only empty buckets on conveyor are filled.

Continuous feed of the mix results in continuous production of carbide. The nine feed chutes provide continuous feed of mixed charge to furnace around three electrodes below which chemical reduc-

(Please turn to next page)

◀ Rotating furnaces at Calvert City are of Norwegian design, produce better than 200 tons per day each

Circular-path bucket conveyor carries mixture of components to feed chutes ▶

Lower level of chiller conveyor line showing tap holes in rotating furnace. Molten calcium carbide hits the chiller buckets at approximately 3700°F

Chiller buckets, each weighing 1300 lb, are suspended between strands of 6 x 1 x 24" pitch steel chain

(*Continued from preceding page*)

tion takes place and molten calcium carbide is formed.

The Real Trick

When the tap hole of the rotating furnaces approaches pouring position, it is burned open with a tapping carbon. Material at 3700°F, one of the highest temperatures ever handled by conveying equipment, pours from hole to chiller buckets. As the molten carbide is tapped, a thin chill forms, effectively insulating the chiller buckets from the material's heat — buckets reach temperatures of only 400°F. Chiller buckets weigh about 1300 lb each and are low-alloy cast iron. Each bucket is divided into four molds (approximately 8 x 20" each) and in normal loading form pigs of this size by 2" thick. Each bucket is suspended between two strands of 6 x 1 x 24" pitch .45-carbon-steel chain.

Capacity of each chiller is approximately 11 tons per hour. Chillers have about a 55-ft carry on the lower run and a 90-ft vertical lift. Chain speed is about 20 feet per minute and allows about 12 minutes cooling time. White-hot carbide cools to about 2000°F in this time but it is still cherry red as buckets are tripped to discharge into a carbide chute before the crushers.

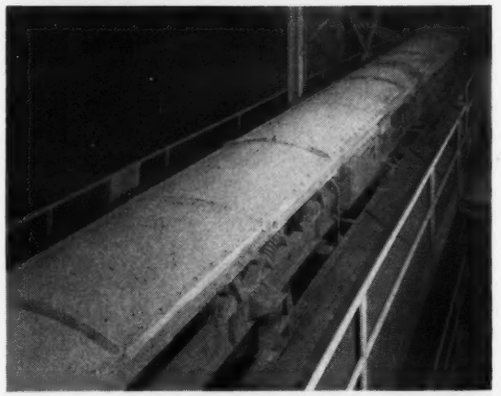
Handling Cooled Carbide

Twenty-eight oscillating conveyors are used in various combinations for transporting material from crushers to coolers to storage and loading facilities. Combined total length of six conveyor lines is 1060 feet. Conveyor troughs have concave steel pans, designed to provide maximum strength and to allow for expansion when heated by material. Four 36-inch oscillating conveyors move 1700°F carbide from four crushers to elevators. Elevators may discharge to a 42-inch oscillating conveyor which in turn transports material to one of three coolers.

As cooled material (around 300°F) leaves the cooler, it discharges to one of two 42-inch oscillating conveyors. These conveyors are fully enclosed to confine, and take under control, any emissions of "dust" or possible attack by atmospheric moisture. Either unit feeds cooled material to elevators which discharge again to oscillating conveyors for moving product to storage bins. These conveyors are also fully enclosed.

Carbide is drawn from storage for outbound bulk shipments or for delivery to on-the-spot facilities by which the calcium carbide is converted to acetylene gas by the carbide-to-water process. The acetylene is delivered to consumers on industrial tracts adjacent to National Carbide, via a system of transmission lines. Present pipe-line acetylene consumers at Calvert City are B. F. Goodrich Chemical, General Aniline & Film, and Air Reduction Chemical.

(Conveyor installation at Calvert City was designed and built by Link-Belt Company, Dept. CP, Prudential Plaza, Chicago, Ill. . . . or for more information check 6819 on form opposite last page.)



Oscillating conveyor system for handling crushed product from coolers to storage. Conveyor is fully enclosed to confine dust and prevent entrance of moisture

Electric motor and pump furnish . . .

ULTRASONIC ENERGY FOR HOMOGENIZATION

CP Staff Photo
Homogenizer can be mounted on 55-gallon drum to emulsify a batch, pumping directly into another drum for shipment

Resonant structure in flow line reduces particle size to as small as one micron, increases shelf life of emulsions

WILLIAM C. CLARKE, Assistant Editor

Problem: Manufacturing emulsions for various purposes, Hart Manufacturing Company of Jersey City faced two principal bugaboos in emulsification.

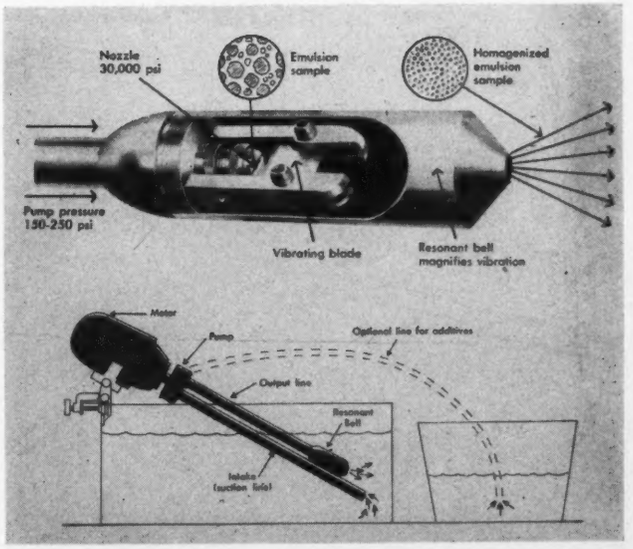
Pilot plant quantities to be produced were small enough that machine holdup amounted to an appreciable part of the batch. Some of the products were two- and three-component emulsions containing 20 to 30% solids. Oils, waxes, and other specialty materials for textile, leather and paper use were too costly to be wasted in machine holdup.

A second problem arose with some of the more difficult emulsions — choice and quantity of an emulsifier. Since Hart products have to pass six-month stability tests, considerable time went into finding and testing emulsifiers. And there were some cases where so much emulsifying agent was needed that percentage of active material in the finished product was noticeably lowered.

Solution: Two years ago, Hart Manufacturing Company installed an ultrasonic mill that reduces particle size with high frequency energy. Ultrasonic wave produces dispersion under pressures of 30,000 psi. Resonant bell concentrates the energy and gives violent molecular acceleration with continuous cavitation.

Gear pump sucks fluids into intake line of homogenizer and discharges them at pressures of 150 to 250 psi against a small blade. Blade vibrates at its own frequency, about 22,000 cps, and disperses the fluid

(*Please turn to page* 18)



Cutaway drawing of resonant bell (at top) and schematic of homogenizer in use

Incoloy, an alloy originally developed as a substitute for higher nickel compositions during the period of Korea, is shown to be equal or superior to other alloys used for furnaces in the field of ethylene manufacture since it —

RESISTS CARBURIZATION AT 1750°F

Problem: During the period of Korea in mid-1951, NPA regulations would not permit the use of extruded Inconel tubes for ethylene furnaces by Gulf Oil Corporation at Port Arthur, Texas. Tubes were to be installed in the critical firing zone in the radiant section of the furnace units where metal temperatures may be as high as 1750°F. It was desired to incorporate the Inconel tubes in furnaces because it was an established alloy.

Solution: Major portion of the order for furnace tubes was accepted in Incoloy, which although thought to be satisfactory, had not been used in this particular application before.

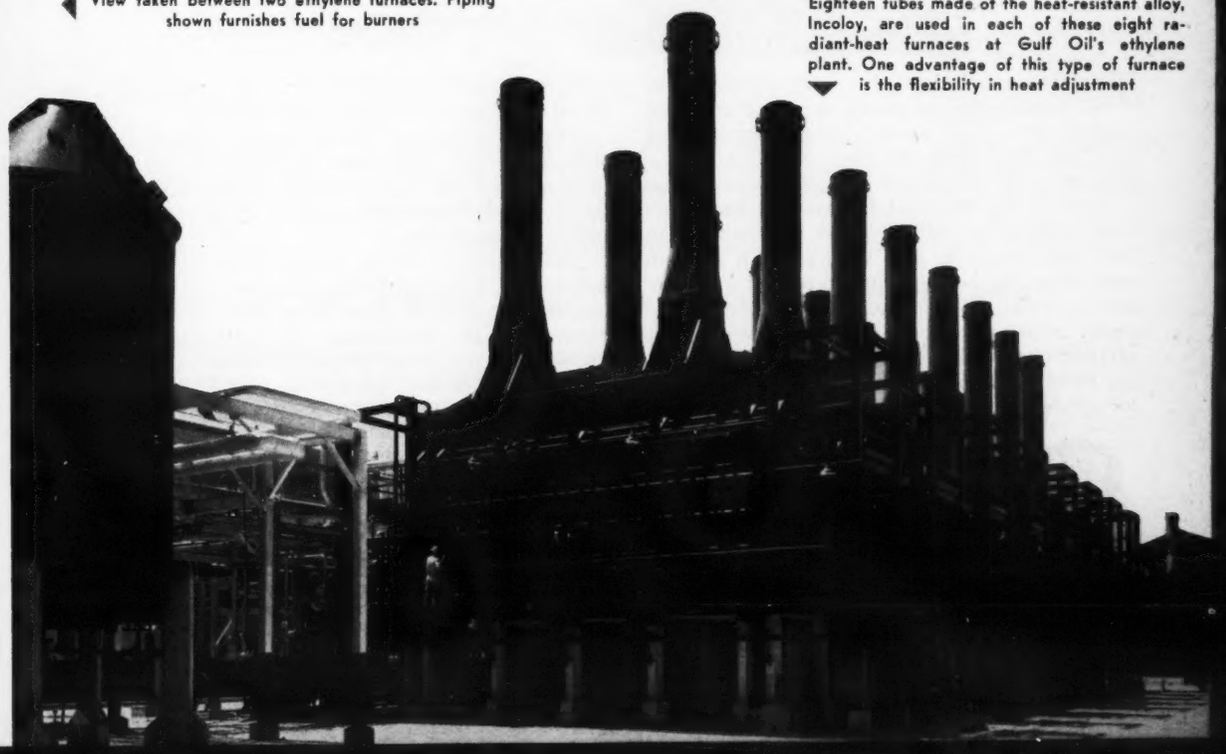
Incoloy is a nickel-chromium-iron alloy suitable for high temperatures, with good resistance to oxidation. It has strength at elevated temperatures and good workability and welding properties Chemical composition of alloy is as follows:

Carbon, max	0.10%
Manganese, max	1.50%
Sulfur, max	0.30%
Silicon, max	1.00%
Copper, max	0.50%
Nickel (plus cobalt)	30-34%
Chromium	19-22%
Iron	Remainder

(*Please turn to next page*)

◀ View taken between two ethylene furnaces. Piping shown furnishes fuel for burners

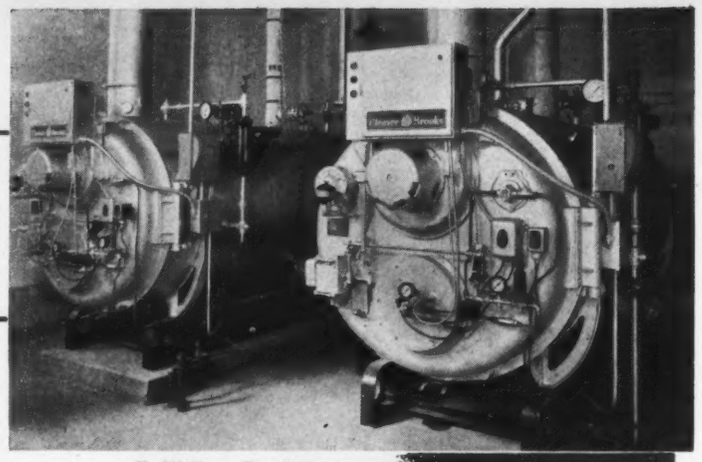
Eighteen tubes made of the heat-resistant alloy, Incoloy, are used in each of these eight radiant-heat furnaces at Gulf Oil's ethylene plant. One advantage of this type of furnace is the flexibility in heat adjustment ▼



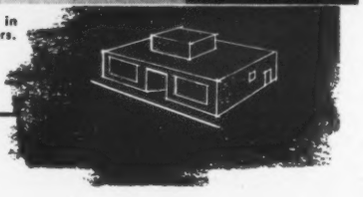
18 sizes

110 models

15 to 600 hp

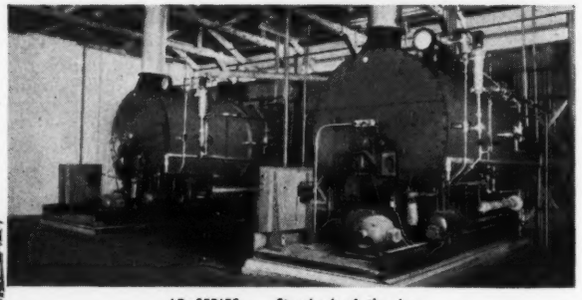


CB SERIES — The ultimate in compact, quiet-running boilers. Sizes: 15 to 150 hp.

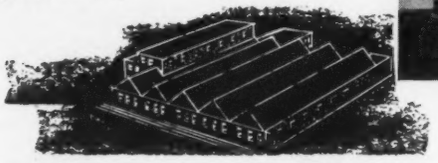


yours from Cleaver-Brooks

the broadest line of cost-saving "packaged" boilers—for hundreds of applications



LR SERIES — Standard of the industry for hot water or steam service, for heating or processing. Sizes: 200 to 600 hp.



THE two installations above are representative of Cleaver-Brooks' broad range of standard models. The wide choice makes planning and selection of a boiler for your specific needs — large or small — a simple, time-saving procedure.

Your nearby Cleaver-Brooks representative, with years of specialized boiler experience, can be of real service to you. Working with you and your engineers, he can help you to find ready answers to questions of size, loads, present and future steam or hot water needs, space and equipment arrangement. Where local conditions dictate, oil, gas or combination oil/gas firing can be selected for greatest savings. And once installation is completed, arrangements are made for factory-supervised starting and training your operator.

Keep in mind, too, the many fuel and maintenance-saving advantages of four-pass design with forced draft . . . the standard equipment electronic combustion controls which assure continuous, safe operation.

Cleaver-Brooks boiler owners enjoy all these advantages and share in the combined application engineering experience of more than 19,000 individual boiler installations. Put this experience to work for you. Cleaver-Brooks Company, Dept. J, 349 E. Keefe Ave., Milwaukee 12, Wis., U.S.A., Cable Address: CEEBEEWEST — all codes.

See the classified pages of your phone directory for name of nearest representative. Send us your name to receive regular issues of the new Cleaver-Brooks Bulletin, or write for newest literature.

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TWENTY-FIVE YEARS OF LEADERSHIP
BY THE ORIGINATORS OF THE SELF-CONTAINED BOILER

When inquiring check 6820 opposite last page

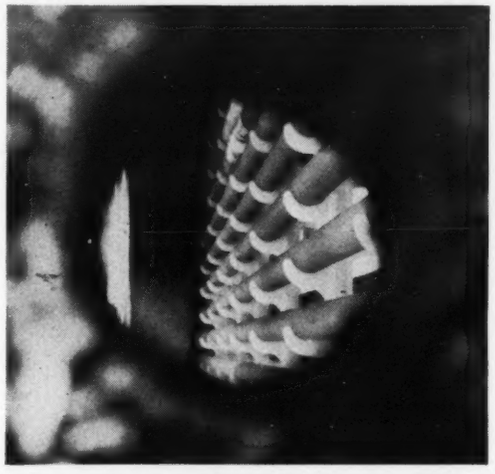
Ethylene Furnaces

(*Continued from preceding page*)

Incoloy furnace tubes are used in the as-extruded condition, which involves a minimum of mill processing and, hence, offers a price advantage over other highly alloyed materials which are pierced and cold-drawn. In addition, strength at operating temperatures of the as-extruded structure is generally superior to finer-grained alloys formed into tubes by cold drawing.

Thermal expansion of Incoloy is relatively low, minimizing the warping and thermal stress which may occur during temperature cycling.

Because of its high nickel content, Incoloy is structurally stable and does not form the embrittling phase, sigma, on prolonged heating at intermediate temperatures.



Furnace was at temperature when this picture of interior was taken through a peep hole. First nine tubes from bottom are Incoloy. Another row of nine made from same alloy is out-of-sight at right

This makes it possible to weld repair tubes after they have been in service without the need for prior heat treatment. It also eases the problem of welding previously used tubes to return bends. These return bends are usually of HH alloy (24 Cr/12 Ni) case with a thicker wall on the outside radius, since serious abrasion problems result from the extremely hard coke formed in process which passes through pipes at gas velocity approaching 600 ft/sec.

Carburization is more often a serious problem in ethylene manufacture during decoking operation rather than when the furnace is on stream. Decoking is generally accomplished by passing steam or a steam-air mixture through the tubes. Reaction with firmly adherent coke deposits can cause embrittlement from carburization in susceptible materials. In extreme cases, lowered melting point of

material (from carbon pickup) combined with a hot spot from burning of the coke, may actually cause melting of the tube. Incoloy's good carburization resistance minimizes this danger.

Tubes used in ethylene furnace coils are usually 4 to 5¼" in diameter, with ¼" wall thickness, and 18 to 40' in length. A furnace contains from 15 to 36 tubes, in radiant section, depending on design. In one bank of eight cracking furnaces at Gulf, each furnace contains a total of 18 tubes made of Incoloy. These consist of the bottom nine on each side of each unit in the zone of highest temperature. Other alloys used in progressively cooler zones are 304 stainless, 406 stainless, and carbon steel.

Gradiation furnaces use rows of radiant-ceramic cups to furnish heat. These units have high flexibility in adjusting heat to meet operating conditions. Zone control of heat input enables units to meet any time-temperature curve in pyrolytic or catalytic reactions and high temperature preheating. Uniform heat distribution on entire tube surface extends tube life by eliminating local overheating and material degradation at tube wall. Little or no excess air helps minimize possible oxidation of tubes.

Results: Incoloy tubes have given excellent service at Gulf ever since they were first installed in mid 1951 in No. 1 Unit. Tubes have been used in actual cracking service more than 9000 hours. Maintenance has been very slight — mainly replacing one or two feet at outlet end of several tubes.

Additional Incoloy tubes were installed in Gulf's No. 2 Ethylene Unit, which went on stream in 1955. Incoloy has also been used in ethylene furnaces at a number of other companies. Hence, an alloy developed as a substitute during a period of high demand for nickel, has been shown to be equal or superior to other alloys used in the field of ethylene manufacture.

Gradiation furnaces in use at Gulf have operated without shutdowns for periods well in excess of 30 days. High conversions and selectivity have been maintained.

(Incoloy alloy is product of The International Nickel Co., Inc., Dept. CP, 67 Wall St., New York 5, N. Y. . . . or for more information check 6821 on form opposite last page.)

(Gradiation furnaces installed in Gulf's No. 2 Unit were manufactured by Selas Corp. of America, Dept. CP, Dresher, Pa. . . . or for more information check 6822 on form opposite last page.)

This month's Processing and Engineering Data section starts on page 174

NEW in Design ...Performance ...Economy

ALLIS-CHALMERS Stainless Steel GYRATORY SCREEN

Stainless Steel Construction makes cleaning easy... is corrosion resistant.

Large Screening Capacity. Self-contained unit provides as much as 35 square feet of screening area in 16 square feet of floor space. Gyratory action exposes product to all of screen cloth.

Wide Sizing Range permits handling of product sizes from 4 to 200 mesh.

Extra Cooling Surface of rib-type motor eliminates insulation burnouts under normal operating conditions.

Simplified Dismantling. Vertically locked deck arrangement eliminates need for enclosure. External tie rods facilitate fast removal of decks.

No hard-to-clean Nooks and Corners.

Dust-Tight — wide variety of installation-proved materials available for compression-type seals.

Two, Three, Four Separations . . . one outlet for each different size product. Collars and adjustable changes provide for quick attachment of flexible outlet tubes.

Full Freedom of Gyratory Motion made possible by universal-type stabilizers. No lubrication needed.

Low Power Requirements. A 1-hp motor drives unit of three or four decks.

Quiet, Vibrationless Operation assured by dynamically balanced mechanism.

Product Quality Protected. Gentle motion minimizes disintegration of foreign particles.

Secure, Vibrationless Foundation provided by sturdy, all-welded steel base.

You Get MORE When You Specify ALLIS-CHALMERS

Top efficiency in screening . . . maximum capacity . . . profit-insuring quality control . . . quick 'n' easy sanitation . . . simplified maintenance . . . economical operation — all these important advantages are yours when you specify Allis-Chalmers.

Your Allis-Chalmers representative will be glad to tell you more about this newest and finest of gyratory screens. Call him. Or write for descriptive Bulletin 07B8446. Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

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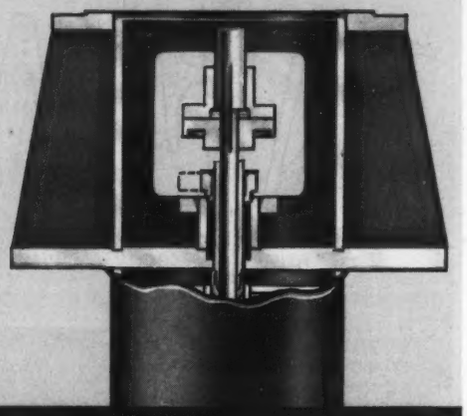
A-5074

When inquiring check 6823 opposite last page

Engineered for pumping liquid oxygen or nitrogen at minus 300° F.

Whatever your liquid oxygen or nitrogen pumping problems... processing, transfer or loading... Byron Jackson now has the *completely dependable* pump answer!



Byron Jackson announces the first completely dependable liquid oxygen pumps!

These BJ Liquid Oxygen Pumps are the result of years of research and development... with special emphasis on metallurgy and shaft sealing techniques.

Several models are offered to solve individual liquid oxygen and nitrogen handling problems... with capacities and pressures as required. Special, compact tank truck pumps are included.

Whatever your need, you can be sure of dependable, efficient liquid oxygen or nitrogen handling with these tested BJ pumps. For additional information write:

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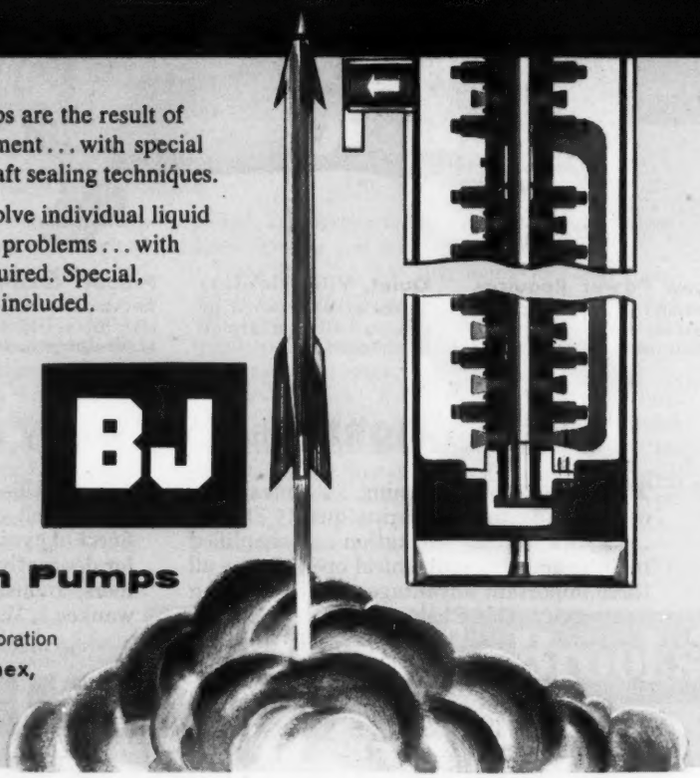

When inquiring check 6824 opposite last page

Ultrasonic Mill

(*Continued from page* 13)

in the resonant chamber. Pump is driven by a two-hp motor powered by 220 or 440v AC, 3-phase, 60 cps. Output capacity of mill is 5 to 7 gpm or 300 to 420 gph. Two pumping lines are stainless steel. An additional line can be added to pump for incorporating additives separately from fluids already mixed. Unit is cleaned by unscrewing bell, although running solvent through lines is often sufficient.

CP Staff Photo

Vibrating blade is held in place by set screws. Resonant bell is removed for cleaning

Results: Hart Manufacturing Company has been using the ultrasonic mill for a wide variety of products. Emulsions have been produced with less emulsifier, and, in some cases, no emulsifiers. Emulsions produced have been stable, passing stability tests over long periods of time. Particle sizes down to one micron are observed.

Maintenance has been negligible — unit has required only lubrication. Because of portability and versatility in handling both long and short production runs, mill has become a working tool in producing stable emulsions.

(Rapisonic Homogenizer is product of the J. H. Day Company, Dept. CP, 4932 Beech Street, Cincinnati 12, Ohio . . . or for more information check 6825 on form opposite last page.)

as you read **chemical processing**

. . . you may be wondering why you have been selected to receive it regularly . . . without subscription charge.

The Editors explain on page 122.

Trends . . . John C. Vaaler and Bruce Fader discuss the significance of current happenings in . . .

Chemical Business

This is the second issue of CHEMICAL BUSINESS brought to you as a regular feature of CHEMICAL PROCESSING. This news has been added to the regular news coverage of the magazine in the belief that the quick pace of the chemical industry demands that technical people keep abreast of business as well as technical happenings.

New power source

. . . is being looked on as a contender with atomic piles for future power. It is a "fuel cell' . . . a device which can supply electric power directly from fuel with no moving parts.

With more than 100 years of research behind it, the fuel cell would not be news except for practical results now coming to light — production of electric power at an efficiency of 70%, for example.

Three versions now in operation: 1) **Prof. Justi** of Brunswick Technical High School in Germany uses hydrogen and oxygen with porous electrodes of nickel and coal at low temperatures, efficiency is 70%. 2) A cell at Cambridge University uses same fuel, operates at 200°C and 600 psi. 3) Not strictly a "fuel cell", a device being tried in Germany and England uses seawater and fresh water separated by a membrane to produce a voltage.

Reports on the work of **F. T. Bacon** at Cambridge note that the cell is capable of more efficient use of fuel than any heat engine and cite possible uses (rail and highway traction, power generation). Cell characteristics (about 1 volt, open circuit to 0.6 volt at 1000 amp/sq ft of electrode) would make it a natural for low-voltage DC used in electrochemical processes.

European developments

. . . have led eighteen interested American firms to form an information pool and news gathering service. This program (called European Technological Observation Group) will be a function of the Armour Research Foundation. A story in May CHEMICAL PROCESSING reported this at the project stage.

While some of the firms prefer to be anonymous, Parke-Davis, Quaker Oats, American Hard Rubber, International Minerals, and Mosinee Paper are among them. The program will accept only non-competing firms as members.

Five Armour engineers under international department manager **Paul B. W. Gollong** will do the observing from headquarters in the Hague. These five engineers are all specialists and will be working in their own fields for four companies each.

Synthetic commercial diamonds

. . . are another step closer, according to **J. S. Gillespie,** manager of GE's Carboloy diamond project. On the occasion of the presentation of a cluster of GE's first man-made stones to the Smithsonian Institute, he stressed that "we have been making steady progress in bridging the gap between the first experiments and production."

GE research people working on the diamond project have been able to reach — and maintain for sustained periods of time — simultaneous pressures of 2,700,000 psi and temperatures exceeding 5000°F.

Peracetic picture

. . . becomes more detailed as information is added to last month's CHEMICAL BUSINESS report. Carbide people have revealed that they expect to be in production ("somewhere around 25 to 50 million pounds a year") in 18 to 24 months. Plant location will be West Virginia, "probably as a new addition to an existing Carbide plant."

While they expect that their peracetic acid will make some big changes in epoxies, CCC planners expect that they'll have an even bigger market in derivatives made in their own plants. (One example: butadiene dioxide. Even with its $2/lb price tag, this chemical has elicited inquiries for drum lots. Other materials show even more promise than this.)

Price for the peracetic itself is estimated to be about 40 to 45 cents a pound as shipped — about $1/lb on an active ingredient basis. Dilution (with acetic acid) is necessary for shipping.

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Marketing Trends

(Continued from preceding page)

New acrylic fiber

. . . to be marketed by American Cyanamid Company about middle of 1958 with limited quantities available toward end of 1956. Fiber is trademarked Creslan. Construction of plant for production of fiber will start in December, 1956 with tentative site located in northern Florida. Annual productive capacity, staple and tow, is estimated at 27 million pounds. (Total production of non-cellulosic synthetic fibers in U. S. during 1954 was 292 million pounds.) Cyanamid has designed the plant with 100% expansion potential. Competition will be Union Carbide with Dynel, Tennessee Eastman with Verel, DuPont's Orlon and Chemstrand's Acrilan.

Suspicions are growing

. . . that the Navy is working on new aircraft fuels that are not petroleum based and which contain no petroleum.

Shedding small but significant light on the project, the Navy gave only a grudging explanation because a request to Congress for a $35 million plant had to be made public.

It is reliably reported that the chief starting component of the new material will be coal. Heretofore, research into uses of coal for producing a petroleum-type fuel has been carried on by the Department of Interior's Bureau of Mines. The Bureau had advanced to the point where it could show that a fuel of that type could be made (as did German scientists during World War II) but could not make the synthetic gasoline at competitive prices. Now the Navy seems to have something new.

In a brief news release, referring to a "chemical based fuel," they say only that the authorization is sought to buy 1310 acres of land to put up a "production plant."

Polypropylene Scramble

Not only better—but different—is story on polypropylene. Another segment of potential polyolefin plastics market is to be explored . . . with polypropylene. Research is about completed by a number of American majors but results were being held back to complete developmental picture. Montecatini announcement of polypropylene process and its availability for licensing will push disclosures far ahead of schedule. Du Pont, Carbide, and Phillips may soon be ready to talk about their polypropylene programs.

Standard Oil Company (Indiana) has already licensed Eastman to produce polypropylene plastics under patents issued to Standard Oil engineers.

Montecatini process involves low pressure, catalytic polymerization—producing polymeric substances with regular structures. Plant quantities of polypropylene have already been made. Other resins, as polybutylene, highly crystalline polystyrene, and polybutadiene, are still in an experimental stage—so far as Montecatini-Natta process is concerned.

Commercialization of polypropylene will initially be based on resistance to heat and solvents not possessed by polyethylene. Natta process yields a polypropylene which is a homogenous, crystalline resin. Melting point is 160°C or 320°F compared with about 250°F for low pressure polyethylene. Natta PP also lacks waxy feel and has a high tensile strength. Anticipated uses include film, molded and extruded plastics . . . and especially as a fiber of very high strength.

Commercial production of several tons a day is already planned by Montecatini. Since propylene cost is appreciably below that of ethylene, polypropylene is currently competitive with polyethylene. Availability of propylene as a gas vented by petroleum refineries will change as large scale usage develops—increasing costs.

Will rapid expansion of polyethylene production be affected by Natta process? It is still too early to forecast. Union Carbide plans to build two plants for production of low-pressure polyethylene at Institute, W. Va., and Seadrift, Texas. Combined annual capacity will be 55 million pounds. Texas Eastman is broadening production in field of high-density PE plastics with a semi-commercial unit at Longview, Texas. One guess is that potential market will expand with polypropylenes, becoming broader rather than commercially competitive—similar to competition of original high-pressure polyethylenes with Ziegler and Phillips low-pressure materials.

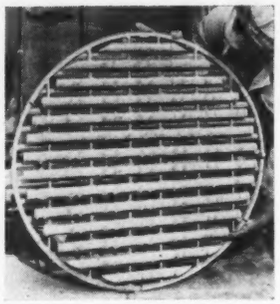
Alarming figures for 1965

. . . offer no solution but define industry's manpower problem. A new study by the MCA has shown that the nation is facing a shortage of over 450,000 engineers and scientists by 1965. Total required by industry in 1965 . . . 1,680,000. But only 1,223,000 will be available. And chemical industry will be among the hardest hit. To meet projected requirements, 199,000 technical people will be needed . . . with only 106,000 available.

(Chemical Business continues on page 115)

Magnetic grate protects pulverizers against tramp iron damage in dye plant . . .

removes ferrous contamination from material to be ground, eliminates frequent shutdowns



Separators are easily removed for cleaning, retain their magnetic power indefinitely

Problem: Tramp iron and other fine ferrous contamination was causing frequent damage, repairs, and replacement of the screens of Micropulverizers at Toms River-Cincinnati Chemical Corporation, Toms River, New Jersey. As part of process for manufacturing vat dyes, the high-speed pulverizing equipment is used for grinding dyes and intermediates. The tramp iron is in the barrels of materials to be ground.

Solution: To control this situation, engineers installed a 30″-diam non-electric magnetic grate separator in the charging hopper of the pulverizers. Composed of a series of magnetic tubes powered by Alnico-V elements, tubes generate an overlapping network of magnetic fields which instantly detects and grips any large or small bits of iron, without affecting flow of non-magnetic material. Separators are ready for instant installation, are maintained by nothing more than simple, periodic cleaning, and are capable of retaining their magnetic power indefinitely.

Results: Separator has been so effective that it is now rare to replace screens because of damage caused by tramp iron. Results were so satisfactory that additional units have been installed on other pulverizing equipment.

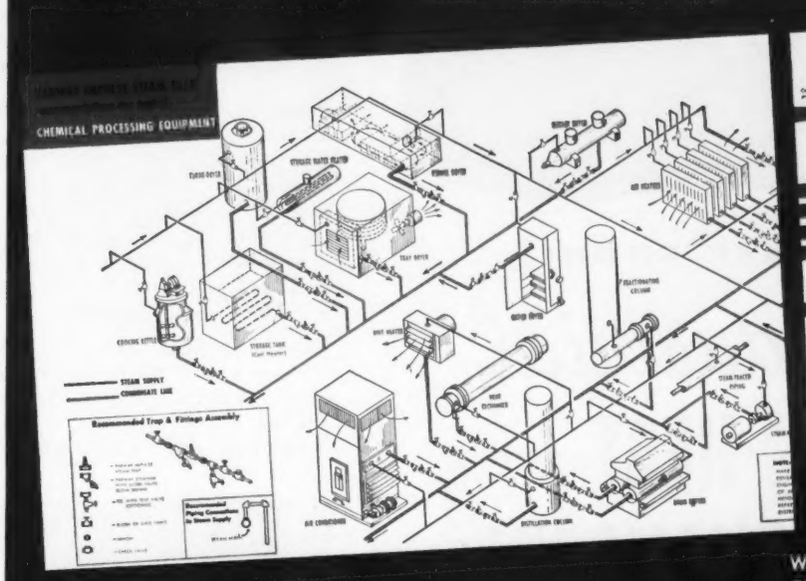
(Magnetic separators are product of Eriez Manufacturing Company, Dept. CP, Erie 6, Pa. . . . or check 6826 opposite last page.)

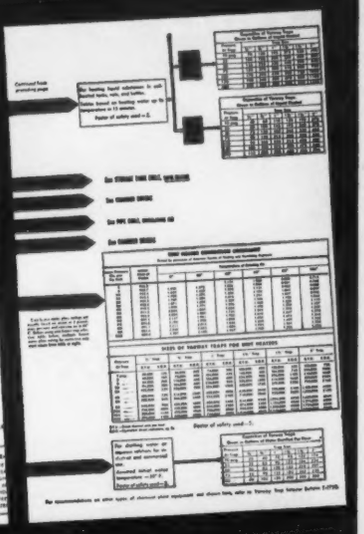
Case histories on pipe of asbestos cement

Ten-page brochure of Transite asbestos cement pipe suggests range of uses, describes how the pipe is made, and cites case histories of various installations. Diagrams and photographs explain why the recently introduced Ring-Tite coupling is a major step forward in economical assembly.

Bul TR-51A is issued by Johns-Manville, Dept. CP, 22 E. 40th St., New York 16, N. Y. Specify 6827 opposite last page.

HOW TO TRAP CHEMICAL PROCESSING EQUIPMENT—*PROFITABLY*





Write for your free large scale Chemical Piping Diagram and Steam Trap Selector.

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When it comes to picking the right steam trap for the right job, this YARWAY bulletin is invaluable.

Piping diagrams for trapping 22 typical kinds of process equipment are shown—and selector tables covering 35 types of equipment.

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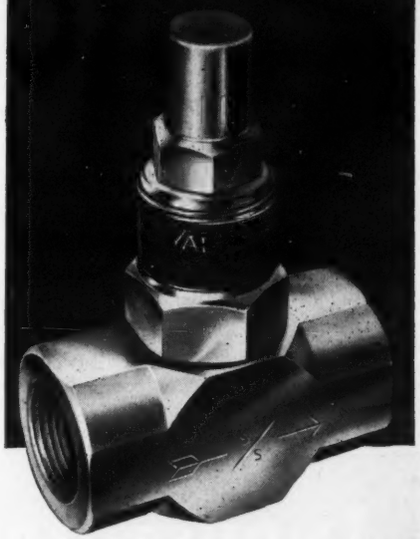

Yarway Impulse Steam Trap. Gets equipment hot in a hurry and keeps it hot! Stainless Steel. Good for all pressures. Only one moving part.

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When inquiring check 6828 opposite last page

When your process runs a temperature

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Industrial offers complete design and manufacturing service. Experienced engineers will give you fast accurate answers to the questions of size, single or multiple pass, concentric tube, or tube bundle, series or parallel. Industrial's plant is large and versatile . . . able to machine and fabricate any required materials . . . and ship completely assembled exchangers.

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In advance—Write for "Heat Transfer Equipment" Bulletin 600-2.

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Industrial

When inquiring check 6829 opposite last page

One man does work of three with mobile elevator on loading job . . .

unit replaces old method of rolling heavy drums by hand up or down wooden skids

Problem: Loading and unloading drums of material to and from trucks was a laborious and time-consuming job at The Fine Colors Company, Paterson, N. J. The steel containers had to be rolled by hand up or down skids placed from the tail gate of the truck to the ground. Space limitations made it impractical to build a truck loading ramp and prohibited the use of a fork lift truck or similar heavy equipment.

Some of the filled drums weighed as much as 450 lb — making it impossible for one man to handle them alone. Each time a shipment was made or received, it was necessary for the shipping clerk to round-up two men from some other department.

Mobile elevator simplifies shipping, receiving operations at The Fine Colors Company, Paterson, N. J.

Many times this resulted in time lost from production operations. Of even greater concern however, was the safety aspect. There was always the possibility of one of the men injuring himself while handling these drums.

Solution: A mobile elevator with a lift adequate to reach the tail gate of the trucks proved to be the solution. Operated by a single "deadman" lever controlling an electric pump and hydraulic system, the elevator has two roller chains similar to that on a high-lift fork truck. Either chain will handle more than the rated load of the equipment. In the event of failure of one of the chains, the other

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In Chicago: M. B. Sweel Co.
In Cincinnati: Howard Dock
In Cleveland F. W. Kamin Co.

When inquiring check 6830 opposite last page

can still hold or lower the load safely. Elevator occupies a space of 24 x 45½".

Outgoing shipments are brought to the elevator which has been rolled to a position at the tail gate of the truck. Floor lock mechanism on equipment prevents unwanted movement. Drums are easily placed on elevator platform, raised to truck's tail gate, and "walked" into position aboard truck.

Results: Both loading and unloading are now easily accomplished by the shipping clerk without any assistance. As shipping and receiving operations during any given day are not constant, it is difficult to establish an exact cost figure on man-hours saved. As a guide however, it can be stated that one man now does the work that formerly required three. Also eliminated is the worry of possible injury to an employe resulting from old method of handling drums.

(Mobile elevator is product of The Revolvator Company, Dept. CP, 8727 Tonnele Avenue, North Bergen, N. J. . . . or for more information check 6832 on form opposite last page.)

Why cupro-nickel tubes have long life

One of the interesting aspects of 30-page booklet on cupro-nickel heat exchange tubes is the case histories telling how specific corrosion problems have been solved. Large photographs are shown of each installation described. Information given should be of help on similar heat exchange tubing problems.

Cat A-205 is issued by The International Nickel Co., Inc., Dept. CP, 67 Wall St., New York 5, N.Y. When inquiring specify 6833 on form opposite last page.

Cartoonist John Hartsock works for Stanford Research Institute, Menlo Park, Calif.

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use DOW CORNING SILICONE DEFOAMERS

ONE OUNCE OF

ANTIFOAM A — KILLS FOAM IN 160,000 lb coumarone-indene resin

ANTIFOAM A EMULSION — KILLS FOAM IN 12,500 lb zinc sulfate plating bath

ANITFOAM AF EMULSION — KILLS FOAM IN 15,625 lb dill pickle processing solution

Here are the most economical, most versatile foam killers ever developed! Dow Corning *silicone* defoamers boost productive capacity; cut processing time; eliminate waste and fire hazard of boil-overs.

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FOOD PROCESSORS — Now permissible to use time and money saving silicone defoamers: Antifoam AF Emulsion at concentrations up to 34 ppm; Antifoam A at concentrations up to 10 ppm.

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When inquiring check 6831 opposite last page

ACIDS, CORROSIVES AND SOLVENTS

HOT LIQUIDS

TOXIC GASES AND VAPORS

JOHN CRANE TYPE 9 MECHANICAL SEAL

WILL HANDLE THEM ALL!

Wedge and sealing rings molded from DuPont Teflon assure efficient, safe handling of all known industrial chemicals and corrosives at temperatures varying from −120°F. to +500°F. Spring and metal parts are furnished in the metallurgical specification best suited to the particular service. In every way, you get a mechanical seal that is "John Crane" engineered to your requirements—no matter how tough!

The Type 9 Seal has and continues to solve innumerable problems where difficult-to-handle liquids and gases are involved . . . at pressures up to 750 psi. It can do the same for you.

Use the Type 9 Seal on all rotating shaft equipment—centrifugal and rotary pumps, mixers, agitators, autoclaves, other equipment.

REMEMBER: *Your toughest problem can be the Type 9's next success story.* Send for full details today.

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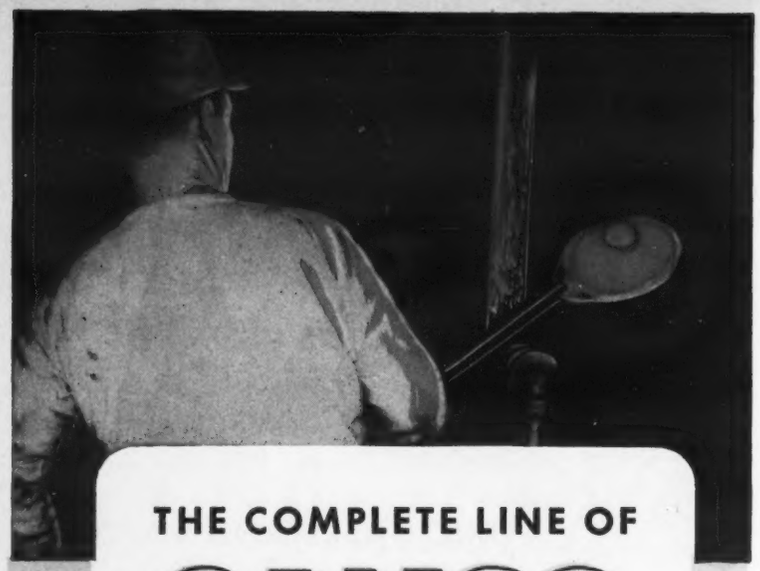
In Canada: Crane Packing Co., Ltd., Hamilton, Ont.

JOHN CRANE CRANE PACKING COMPANY 38 YEARS INDUSTRIAL PROGRESS

When inquiring check 6834 opposite last page



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When inquiring check 6835 opposite last page

NEW SOLUTIONS of processing problems

Submerged combustion case histories

Several case history stories which tell how submerged combustion is being used to advantage in a particular plant are included in an eight-page booklet. Among these are one which tells how this type of unit is used for acid concentration. Other tells about use in a plant for concentration of high boiling point, viscous, corrosive salt solutions. In another part of the brochure information is given on how submerged combustion works and the advantages that can be obtained from it in particular applications.

"Submerged Combustion Units" is issued by Ozark-Mahoning Company, Dept. CP, P.O. Box 449, Tulsa 1, Okla. When inquiring specify 6836 on form opposite last page.

Three-high corrugated mills give clean cut to soybeans without mashing . . .

individual adjustment of rolls on four mills allows close control of cracking

At Central Soya Company's new, modern soybean extraction plant at Chattanooga, Tenn., a clean, sharp cut is given to the beans without mashing by three-pair high corrugated roller mills. Four of these mills crack the soybeans immediately after they enter the plant and are weighed. After cracking, beans go to the dehullers.

Use of corrugated rolls instead of smooth rolls avoids crushing the beans. Each pair of rolls can be individually adjusted to give desired control to cracking. The four units normally handle 21 tons

Roller mills handle soybeans gently

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TODAY'S ELEMENTAL BORON IS DIFFERENT

Through research and production progress, amorphous elemental boron is now available in commercial volume at realistic commercial prices. Today's product is a useful commercial chemical, no longer a research curiosity.

In the Military, elemental boron is being used in Ordnance applications for flares, fuses, ignitors, and propellant mixtures. Commercially, it is used in borides for high temperature applications, and with plastics for lightweight neutron shields.

There never was a better time than now to look into the potential of this fast-growing chemical. Check your requirements for elemental boron, and as a source of supply, Trona has the reputation, the experience, and the know-how to back-up its big production facilities.

Several grades are available

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Sales Development Department

American Potash & Chemical Corporation

3030 W. Sixth St. Los Angeles 54 DUnkirk 2-8231

99 Park Avenue New York 16 OXford 7-0544

*TRADE MARK AP&CC

When inquiring check 6837 opposite last page

per hour although they could handle 28-32 tons per hour. Roller mills have operated with a minimum of maintenance since they were placed in service in April 1955.

(Style N roller mills are product of Allis-Chalmers Mfg. Co., Dept. CP, Box 512, Milwaukee, Wis. . . . or for more information check 6838 on form opposite last page.)

Morton Salt speeds salt mining with carbide cutter bits . . .

used to undercut salt faces up to 50′ wide

Carbide cutter bits, originally developed for difficult potash mining conditions, are turning in a good performance record at the Weeks Island, La., mine of Morton Salt Company. Bits are used to undercut — without interruption — salt faces up to 50 feet in width in preparation for blasting. The tough salt layer, lying underneath potash ore, made undercutting with conventional cutter bits difficult. Regular wide-tipped bits had caused cutting machines to draw excessive high loads, often resulting in burned-out armatures.

The carbide bits are designed with a narrow insert and additional side clearance to make cutting the salt formation easier, faster, and with less power. During a recent shaft operation, at a 750-foot level, rooms were driven 25 feet high and 50 feet wide. The bits produced coarser cuttings, reducing dust and increasing screen efficiency while lowering mill waste.

High wear resistance of the bits has practically eliminated stoppages to replace or spot bits. Fast penetration and long bit life permit two men to operate four drills on a rig and drill out one and one-half 25-feet-high by 50-feet-wide faces in a single shift.

(U-10 carbide cutter bits are product of Mining Tool Division of Kennametal Inc., Dept. CP, Bedford, Pa. Check 6839 opposite last page.)

Pressure-reduction noise cut from 105 to 81 db by use of snubbers

Use of pressure-reduction silencers at a gas-pressure regulation station of an eastern distribution station has reduced the noise level by 24 decibels. Survey made before the units were installed recorded 105 decibels with a gas flow of 415,000 cfh (100 decibels is equivalent to amount of sound inside a New York subway).

After snubbers were installed, readings of only 81 decibels were obtained. The station reduces the pressure of the natural gas from 45 to two psi.

(Snubbers are product of Burgess-Manning Company, Dept. CP, 1203 Dragon Street, Dallas, Texas . . . or for more information check 6840 on form opposite last page.)

GET ULTIMATE DISPERSION

faster, with less power, at lower cost

with new, improved models of

COWLES DISSOLVERS

Here are typical examples of COWLES efficiency compared to ordinary equipment—

Fungicide preparation	Quick dispersion of reactants—finer particle size.
Paint premixes	Ultimate dispersion of pigments up to 10 times as fast.
Sodium dispersion	Smaller particle size. Cleaning problems eliminated.
Starch cooking (textile)	Equal quality at ⅛ the cost with ½ the power.
Ink premixes	Higher quality in half the time of paste mixer.
Gas dispersion	Smaller bubble size—better utilization of raw materials.
Plastisols and Organisols	Satisfactory products in a fraction of the time.

Let us prove it in your plant . . . AT OUR RISK!

You can expect the demonstration to prove that Cowles Dissolvers are the most compact, efficient machines on the market. They will handle a wide variety of materials with viscosities ranging up to and in excess of 50,000 centipoises. Direct peripheral action of new, patented impellers at 3600 to 6000 F.P.M. imparts high velocity to material, creates zones of intense turbulence and shear, breaks down agglomerates to ultimate dry particle size and surrounds each particle with a film of liquid. Operation may be by batch, semi-continuous or continuous.

Typical advantages include faster production, improved quality, greater yields, lower power consumption. All add up to better products at less cost—more profits for you.

If *milling* is required—for grinding or similar processing of organic, inorganic or synthetic materials, a new, improved Morehouse Mill will do the job up to four times as fast. Stainless steel construction prevents contamination—positive adjustment assures accurate end-product control and consistency.

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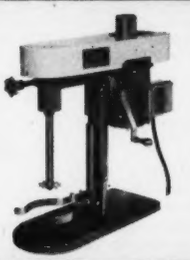
MANY MODELS TO CHOOSE FROM—special engineering adaptations if necessary

Wide variety of dissolver models and capacities. Tank types, mobile, and tip-up units, special adaptations.



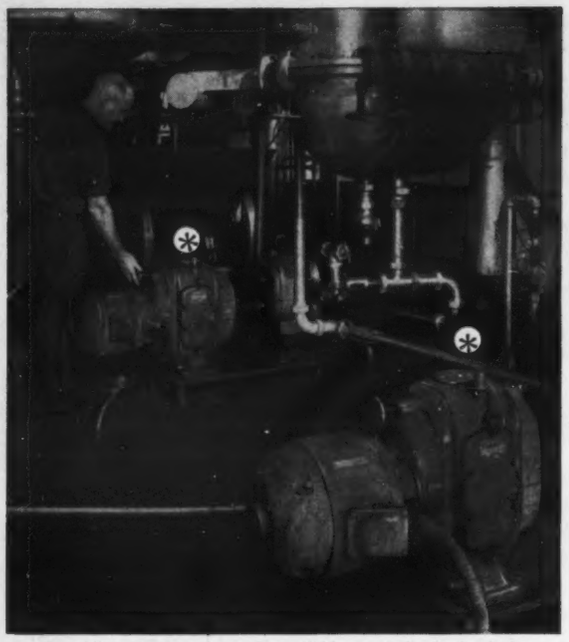
Laboratory dissolver model for testing, etc. Results identical to larger units.

Typical stainless steel unit, available in variety of models and sizes.

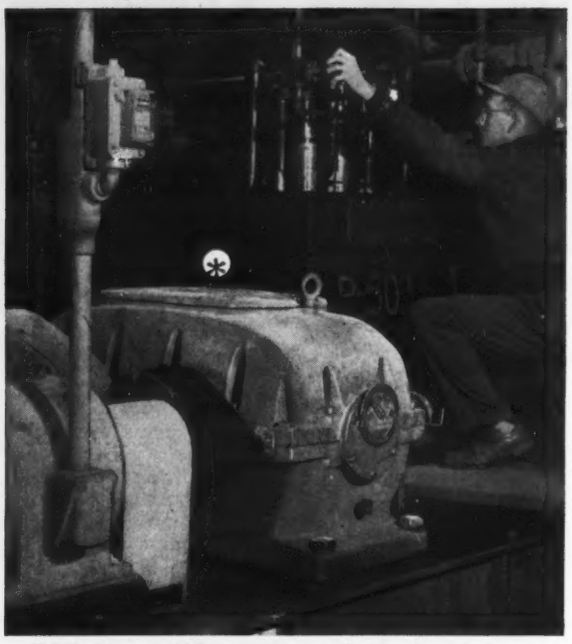
Laboratory mill for testing and small batches. Results identical to larger units.

When inquiring check 6841 opposite last page

Pure milk to pungent ammonia . . .

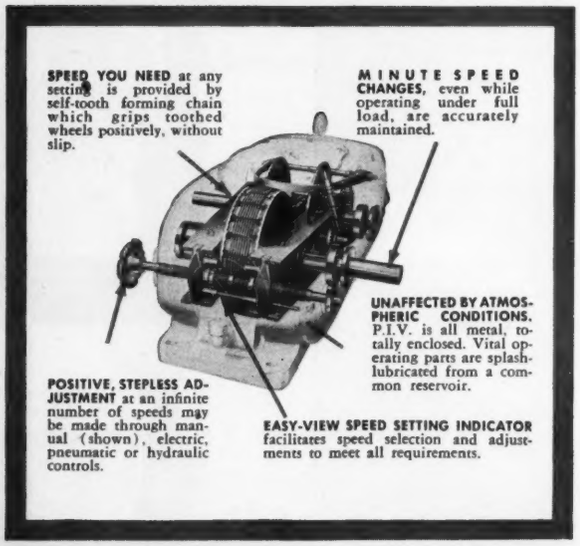


Providing stepless, instantly variable control of circulating pump speeds on this milk condensing system, Link-Belt P.I.V. drives provide extreme accuracy at all settings.



P.I.V. drives on high-pressure pumps handle ammonia in a midwest caustic purification plant. Of all-metal construction, P.I.V. offers resistance to corrosive atmospheres.

IT'S P.I.V.
for instant variation
through a complete range of positive speeds


SPEED YOU NEED at any setting is provided by self-tooth forming chain which grips toothed wheels positively, without slip.
MINUTE SPEED CHANGES, even while operating under full load, are accurately maintained.
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Stepless, non-slip — operates independent of friction

VARIABLE for any speed, positive at all of them—Link-Belt P.I.V. accurately delivers required horsepower from maximum to minimum settings. Turn a hand-wheel . . . push a button . . . or utilize fully automatic controls. The self-pitching chain drive will engage radial-grooved conical wheels at the exact diameters required for precise output-speed delivery.

This positive chain drive—independent of friction—accounts for the unmatched accuracy of P.I.V. at all loads. Moreover, that efficiency is maintained throughout extended service life.

Your nearest Link-Belt office or authorized stock-carrying distributor will assist your selection from 8 sizes and 16 types. You can also get full data by writing for Book 2274.

P.I.V. LINK-BELT VARIABLE SPEED DRIVE

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.073

When inquiring check 6842 opposite last page

Low-cost program controller made from thermostats, clock-driven cam . . .

produces controlled rate of change of 1°F every 4 hours

Problem: In developing an improved method for crystallizing fatty acids, engineers at Fred S. Carver Inc., Summit, N. J., needed some way of changing temperatures automatically at various scheduled times during the process. Process requires temperatures ranging from 130° to 20°F, with definite retention periods at certain temperatures, and a closely-controlled rate of change between each temperature.

Solution: Engineers constructed their own program controller for the process. Built around two thermostats (one for heating circuit, other for cooling circuit), the programming action is supplied by a rack-and-pinion arrangement which resets the temperature-setting screw of the control thermostat as directed by an electrically - driven programming cam.

Cabinet for the unit is a modified 18 cu ft refrigerator containing auxiliary cooling plates and heating elements. The temperature-adjusting screw of the cartridge-type thermostats was extended to outside of refrigerator wall by a 3/16"-diam shaft coupled to the setting screw.

On end of each shaft is mounted a fine-tooth pinion gear which meshes with a rack inserted in a groove in the side of a ⅝"-diam rod. Rod is guided vertically by two bearing blocks on side of refrigerator. As rod moves, it rotates pinion gears, thus resetting the control temperature of the process.

Position of rack is controlled by a cam mounted on output shaft of an eight-day clock mechanism. Contour of the moving cam programs the process by holding rack steady to maintain a constant temperature and by moving the rack at a given velocity to change process temperature at a pre-determined rate.

Each thermostat controls its 110v AC circuit through a series-connected 25-amp relay. When both thermostats are connected, the heating and cooling systems are cycled alternately to provide quicker recovery to the control temperature.

Results: Control set-up has been in use for over six months. On test runs of two to eight days duration, unit has been capable of producing a controlled rate of change of 1°F every four hours. Total cost of controller is estimated to be about $165 — or approximately one-quarter that of an equivalent commercial controller.

(Cartridge-type thermostats used on controller are product of Fenwal Inc., Dept. CP, 243 Pleasant St., Ashland, Mass. . . . or for more information check 6843 on form opposite last page.)

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here's how to get more for your money!

Call your nearby Tube Turns' Distributor. He can fill *all* your needs in welding fittings and flanges—aluminum as well as other piping materials. He provides industry's most complete line—over 4,000 top quality items —different sizes, types, schedules, materials; hence, this one source saves you purchasing time, cuts red tape. He acts as your warehouse. He gives you prompt delivery. And through him, Tube Turns' Engineering Service gives you valuable application help. To take advantage of this cost-cutting service, specify and buy TUBE-TURN Welding Fittings and Flanges.

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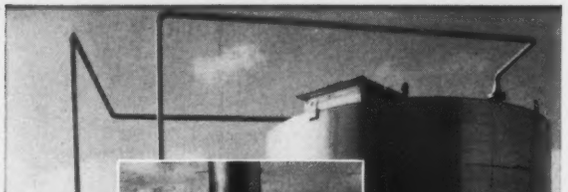
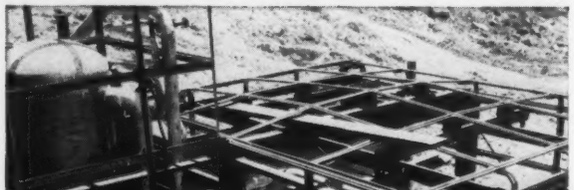
TUBE TURNS' ENGINEERING SERVICE

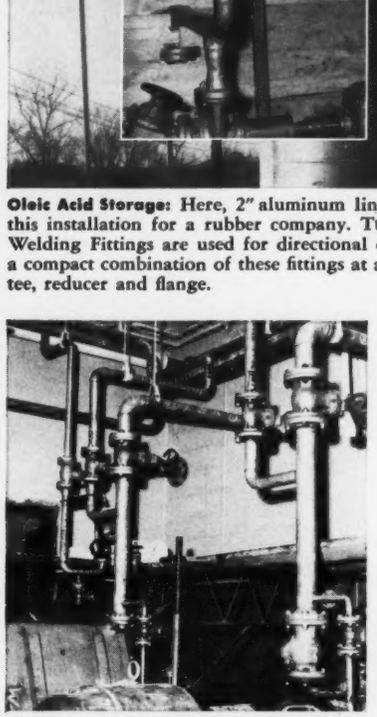
helps you apply aluminum piping on jobs like these...



Oleic Acid Storage: Here, 2" aluminum lines carry oleic acid in this installation for a rubber company. TUBE-TURN Aluminum Welding Fittings are used for directional changes. Insert shows a compact combination of these fittings at a pump . . . an elbow, tee, reducer and flange.

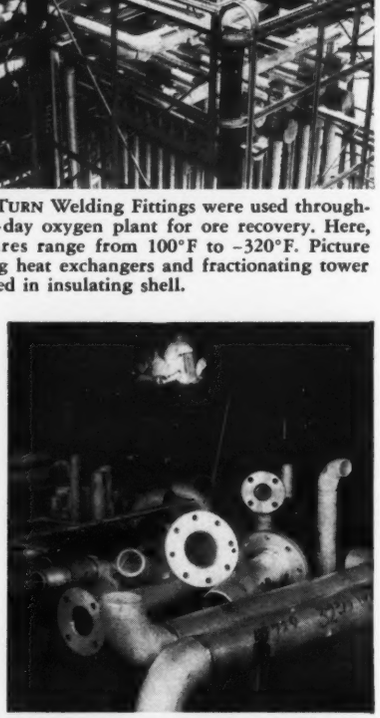


Oxygen Plant: TUBE-TURN Welding Fittings were used throughout this 25 tons-per-day oxygen plant for ore recovery. Here, operating temperatures range from 100°F to –320°F. Picture above shows reversing heat exchangers and fractionating tower prior to being enclosed in insulating shell.



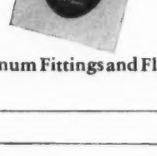
Catalyst Piping: Aluminum piping and fittings were specified for certain services in this new TCR bead catalyst plant to prevent contamination of the catalyst. TUBE-TURN Welding Fittings and Flanges were employed in all aluminum lines from 1" to 10". Result: Lines are permanently leak-proof—maintenance is minimized.

Refinery Wax Coils: Originally, retubing of seven wax sweaters in a large refinery called for coils of another metal. Switch to aluminum piping and TUBE-TURN Welding Fittings saved $50,000 in material costs! Each unit required 900 TUBE-TURN 180° Welding Returns of 1" OD.



Fast Fabrication: TUBE-TURN Welding Fittings and Flanges are dimensionally accurate. Rigid inspection by Tube Turns assures true circularity and uniform wall thickness. Result: Alignment is perfect; fabrication is faster; installation simplified.

NEW BOOKLET—This new Tube Turns' catalog gives helpful information on aluminum pipe, fitting and flange materials. Mail the coupon for your free copy.



TUBE TURNS, Dept. KK-4
224 East Broadway, Louisville 1, Kentucky

Please send free copy of new catalog on Aluminum Fittings and Flanges.

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TUBE TURNS

A DIVISION OF NATIONAL CYLINDER GAS COMPANY

LOUISVILLE 1, KENTUCKY

Crude shellac screened quickly, continuously with compact screen-separator . . .

portable unit handles 10-15 gal solution per min, doesn't require bolting or clamping

Problem: Method of removing insoluble foreign material from a solution of crude shellac, without removing the natural wax also present in the solution, was sought by The Zehrung Chemical Company, Portland, Oregon. Operation is part of process for making bleached shellac from crude shellac (known as "seedlac") imported from the Far East.

First step in process calls for dissolving seedlac in approximately 1% soda ash solution. Density of resulting solution is 65 to 70 lb/cu ft. It contains about 5% undissolved solids such as dirt, bark, and insect bodies which must be removed prior to further processing.

Solution: Company installed an 18"-diameter vibrating-screen separator having 100-mesh, 0.0055"-opening, stainless steel market-grade screen cloth. Solution of crude shellac is screened through separator at feed rate of 10 to 15 gpm. Due to absence of transmitted vibrations and small size of unit, operator need only set unit, without bolting or clamping, on top of tank that receives the screened shellac solution, then plug in power and adjust feed valve.

Plus-100-mesh foreign matter is discharged to drum (right); minus-100-mesh clean solution to vat (left)

Results: Separator helps to obtain high yield from the raw material together with good quality of finished shellac. Insoluble foreign matter is rejected by separator continuously, at a consistency of about 75% solids, into a 55-gal drum. Of the total, only about 1½% of solution is carried out with reject solids (plus-100-mesh). Even majority of this is recovered by simple process of capping drum with a fabric filter cloth and draining remaining solution from the solids.

(Model H-1D5 Sweco vibrating-screen separator is product of Separator Division, Southwestern Engineering Company, Dept. CP, 4800 Santa Fe Avenue, Los Angeles 58, California . . . or for more information check 6844 on form opp. last page.)

For more information on product at left, specify 6845 . . . see information request blank opposite last page.

Waste eliminated in cellulose production with SPARKLER

engineered water filtration system

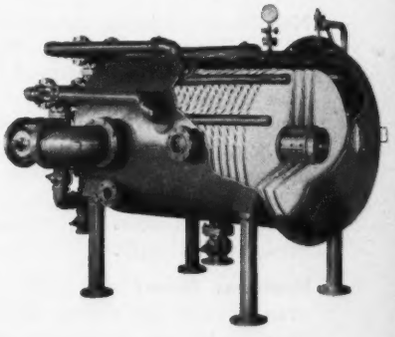
The Three Model SCJ Sparkler Water Filters that purify city water to alleviate waste condition.

Pure white cellulose is produced with Sparkler filtered water.

One of the South's largest producers of cellulose, the Southern Chemical Cotton Co., Chattanooga, Tenn., obtains its water from the City of Chattanooga. This is river water coagulated with alum and passed through gravity sand filters. The chemical and physical properties of this water vary over a wide range due to great fluctuations of demand and change in river conditions. At times conditions are very detrimental to Southern Chemical's cellulose production.

During the conversion of raw cotton linters into chemical cotton, a large amount of water is used. The fine cotton fibres filter out and retain any trace particles contained in the water. Thus, objectionable minerals would discolor and contaminate the material. This resulted in the production of off color cellulose, above specifications of certain elements.

Sparkler SCJ Self-Cleaning Water Filter — A diatomite, surface type filter available in capacities from 900 to 120,000 gallons per hour.



Three Model SCJ-40-25 Sparkler Water Filters, having a total filtering area of 1,200 square feet, were installed to alleviate this condition. These filters handle more than 5,000,000 gallons of water per day and efficiently remove the particles which formerly caused Southern Chemical's production difficulties. Plant officials credit their Sparkler water filter installation with eliminating a troublesome production problem and helping consistently to produce a product of satisfactory quality.

SPARKLER MANUFACTURING CO., MUNDELEIN, ILL.

Sparkler International Ltd. with plants in Canada, Holland, Italy and Australia • Service representatives in principal cities throughout the world.

Filtration engineering and manufacturing exclusively for over 30 years.

When inquiring check 6846 opposite last page

Six diisocyanate compounds supplying a wide range of chemical characteristics are available from manufacturer's interim plant facilities located in Buffalo, N. Y. Four of these isocyanates are now being produced in tonnage quantities. Company's multimillion dollar full scale plant at Moundsville, W. Va., will go on-stream early this fall.

The diisocyanates, by reaction with an active hydrogen-bearing compound, form urethanes which are continually turning up new applications. Major interest at present are latest developments in

URETHANES | *as foams, protective coatings, and adhesives*

TABLE I
Properties of Diisocyanates

Nacconate	Form	Purity (%, Min)	Solidification point (°C)	BP	Sp gr (20°/4°C)	Relative reaction rate
65 65/35 ratio of 2,4-/2,6-Tolylene diisocyanate	liquid	99.5	2-5	118-120 @ 10mm	1.22	initially fast, then slow
80 80/20 ratio of same isomers	"	99.3	10-12	"	"	"
100 2,4-Tolylene diisocyanate	"	99.5	21.5	"	"	"
200 3,3'-Bitolylene 4,4-diisocyanate	solid	99.5	69.6	198-200 @ 3mm	1.197 (d^{4}_{4})	very slow
300 Diphenylmethane 4,4'-diisocyanate	"	99.4	37.5-38.5	175-177 @ 3mm	1.197 (d^{4}_{4})	fast
310 3,3'-Dimethyl diphenylmethane 4,4'-diisocyanate	"	99.5	31	200-202 @ 3mm	1.14 (d^{4}_{4})	very slow

New interest is being aroused by development of six diisocyanates, which complement each other in physical and chemical properties (see table). These products react with compounds that contain active hydrogen atoms, such as alcohols, water, and organic acids. Reactivity depends upon nature of both compounds, and it can be accelerated by catalysts such as sodium and its alkoxides, tertiary amines, or Friedel-Crafts catalysts.

Urethane foams have outstanding tensile strength, are lightweight and fire-retardant. They can be sewn, laundered, and dry cleaned. Materials are oxidation- and light-resistant and can be made in many colors.

In formulating polyurethane foams, it is possible to control the degree of bounce. By producing "dead" foams, a fabricator can produce material which has excellent shock absorbing properties. Such foams have already appeared in dashboards and sun visors of automobiles to provide greater safety to the American motorist. This use is expected to increase tremendously in the next two years.

The foams will also be used widely for all types of cushioning, since they possess the same load carrying capacity of latex foam at just half the density of the latter. Such an

TABLE II
Flexible Foam Formulations

Formulation	Parts by Wt	
Nacconate 80	45	31
PFR-4 Polyester (Barrett)	100	100
Dispersing agent (Witco 77-86, GAF Emulphor 719, or Atlas Span 20)	4.2	1.0
Water	6.0	1.8
N-Methyl morpholine or dimethylethanolamine (Carbide & Carbon Chemicals)	2.5 (1.0)	1.3 (0.5)
Approximate physical properties		
Density (lb/cu ft)	1.6	3.7
Tensile strength (psi)	19	30
Compression set (%)	10	10
Compression to produce 25% deflection (psi)	0.8	1.9
Resilience (%)	25	25
Elongation (%)	398	350

How to do it

1) Prepare catalyst mixture by mixing dispersing agent, N-methyl morpholine and water until homogeneous.
2) Rapidly add Nacconate to polyester under carbon dioxide blanket. Agitate for 30 minutes. Use this prepolymer immediately for best results.
3) Foams may be prepared by either the batch or continuous method. In the batch method, the catalyst mixture is added quickly to the prepolymer and the mixture of the two is agitated vigorously for about 10-20 seconds before pouring into mold. In the continuous method, the prepolymer and catalyst mixture are pumped in separate streams through two metering devices into a completely enclosed high speed mixer. Foam cures in about a week at room temperature, in three hours if placed in a forced draft oven set at 250°F.

TABLE III
Coating Formulations

	Parts by Wt		
	With Nacconate 80	With Nacconate 300	With Nacconate 80 & Plaskon PFR-4
Nacconate 80	570	—	36
Nacconate 300	—	930	
Castor oil (Bakers DB)	1000	1000	
Plaskon PFR-4 (Barrett's modified diethylene glycol adipate polyester)			200
Ethyl acetate	315	465	50
Xylene	315	465	50
Cobalt naphthenate (6% soln in mineral spirits)	3.7	4.7	0.57
Lead naphthenate (24% soln in mineral spirits)	7.7	9.7	1.4

Directions

Nacconate 300 must first be dissolved in the xylene/ethyl acetate solvent and filtered, before adding to the castor oil. Nacconate 80 can be added directly to the castor oil. Stir for about one hour until maximum temperature is reached. Add remaining solvents.

Non-volatile content will be about 70%. For spraying, cut this to 30-40%. Add the catalysts (naphthenates) just before using.

For best properties, cure coatings at 50-60°C for 50-70 hr. For air cure, Nacconate 80 coatings will dry in 7-10 hr, Nacconate 300 coating takes 3-5 hr.

economic advantage is not likely to be ignored by cushioning manufacturers.

Being lightweight, urethane foam is particularly suitable for seating in aircraft. One of the early large volume applications for the foam is expected to be as carpet underlay. Thickness of approximately one quarter of an inch provides a feeling of softness suggestive of more expensive carpeting materials.

This same type of foam has good thermal insulating properties, also. A suggested formulation is given in Table II. Completely rigid foams that are lightweight can be made with Nacconate 80 and glycerine-phthalic-adipic type polyesters. These can take loads as great as 150 psi. The foams can be foamed-in-place, saving labor. Adhesive properties are excellent. Uses in aviation and railroad industries are expanding.

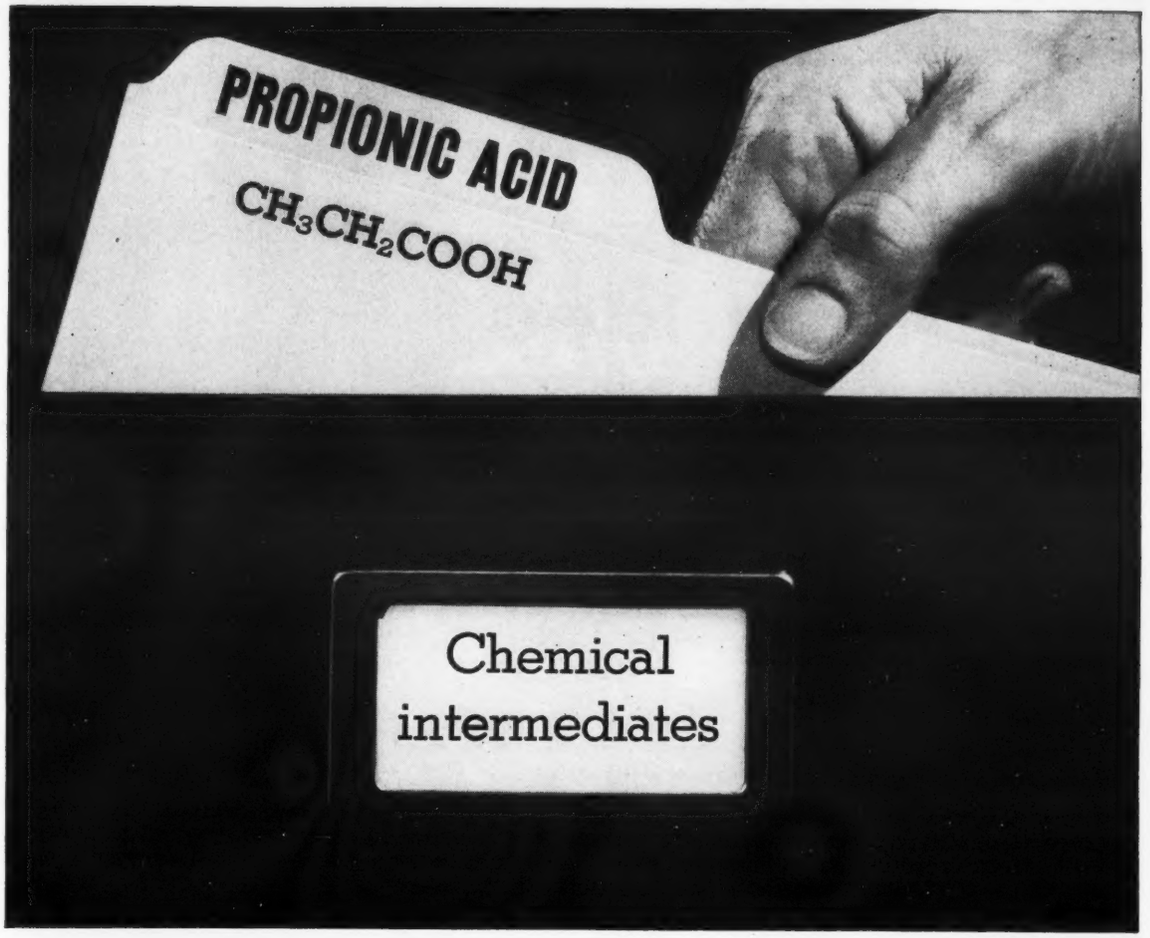
Protective coatings made from polyurethanes dry by chemical reaction between the diisocyanate and the active hydrogens of the second component. This can be at room or oven temperatures. These coatings resist concentrations up to 50% sulfuric acid, 10% HCl, 10% HNO_3, and 10% NaOH. Abrasion resistance may be as much as 40 times that of conventional coatings in some instances. One use that's a "natural" is chemical tank linings.

Continuous films formed on fabric make suitable materials for furniture and automobile seat covers. Padding a Nacconate 310 emulsion on fabrics, ups water repellency, crease resistance, and abrasion resistance.

Adhesives can be made with a number of materials. These give waterproof bonds, and will stick almost anything together: wood, leather, rubber, plastic, metal, and ceramics. Diisocyanate-polyester and diisocyanate-castor oil compositions are both good. Combinations of diisocyanates with natural and synthetic rubbers make another outstanding class of adhesives. Casein, polyamides, phenolic resins are others that can also be used.

Synthetic rubbers are prepared by reacting aromatic diisocyanates with linear polyesters or polyesteramides to extend the chain, then curing the plastic rubber thus formed with more of the same or another diisocyanate. Typical is the ethylene adipate polymer which holds promise for a 100,000 mile automobile tire.

("Nacconate" is a trade name for diisocyanates produced by National Aniline Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector Street, New York 6, N.Y. . . . or for more information about manufacturer's product reader may simply check 6847 on form opposite last page.)



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- Intermediate

isobutyric acid

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isobutyric anhydride

- For the preparation of aromatic esters for perfumes

2-ethyl hexoic acid

- Pb, Mn and Co salts are used as oil paint driers
- Zn and Na salts are used as emulsifying and dispersing agents

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When inquiring check 6849 opposite last page

Useful information on epoxies in chart form

Chart, 11 x 21", offers basic information required in selection of epoxy resins for tooling, casting, laminating, and general coating purposes. Viscosities are given for basic resin and after hardener has been added. Physical properties are reported after twenty-four hour room temperature cure as well as after accelerated cure.

Bul EP-56-98 is issued by Furane Plastics, Inc., Dept. CP, 4516 Brazil St., Los Angeles 39, Calif. When inquiring specify 6850 on form opposite last page.

Evaluates three methods of measuring particle size and surface area of fine pigment powders . . .

gas permeability, low-temp nitrogen adsorption, and photoelectric turbidity methods compared

Evaluation of the three methods for determining particle size and surface area of pigment, extenders, and other finely divided solids was the subject of a very extensive research program. "An Analysis of Surface Area and Particle Size by Gas Permeability, by Low Temperature Nitrogen Adsorption, and by Photoelectric Turbidity" is the title of the report on that project.

This report concludes that the nitrogen adsorption method gives excellent results for determining total surface area but its use for measurement of particle size is restricted to those few cases where no appreciable internal surface is present. Report states that the photoelectric-turbidimetric method offers the most promise for the measurement of particle size, and that the air permeability method for measuring mean particle size must be used with caution and with regard to the type of material under study.

(Information from Technical Report 33-T, issued by Research Laboratory, Sierra Talc and Clay Co., Dept. CP, PO Box 390, South Pasadena, Calif.)

we "hand-pick" our circulation

. . . CHEMICAL PROCESSING is not sold "at random."

A letter from the Editors in this issue explains how key men in chemical processing are *selected* to receive CP regularly . . .

. . . see page 122.

Ramifications of changing to GR-S in non-black molded rubber goods

Four-page, digest-size bulletin discusses problems of replacement of natural rubber with GR-S in non-black molded goods. Suggested recipes are given.

"Hi-Sil Bulletin No. 8" is issued by Columbia-Southern Chemical Corp., sub. of Pittsburgh Plate Glass Co., Dept. CP, One Gateway Center, Pittsburgh 22, Pa. Specify 6851 on form opp. last pg.

Treating wood with copper formate, then heating it, combines copper permanently with the cellulose

this wood resists decay and marine attack and is non-toxic and clean to handle

Accelerated aging tests both in soils and in sea water show that service life of over 20 years can be expected from wood treated with copper formate solution. A 0.8 to 2% copper formate solution is impregnated into the wood and then the treated wood is autoclaved (for example by steaming for three hours at 108°C). A minimum of 0.2% copper should be retained in the wood for good protection.

Treated wood is non-toxic and non-irritating to humans. Even after treatment, wood can be processed as though it were untreated and can be glued, painted, or laminated. The only effect on the wood is that it becomes slightly darker in color. The copper is chemically combined, and won't leach out. Treating solution is odorless and low in cost. (CHEMICAL PROCESSING, June 1956, pp 36-38, described in detail this process for use in preserving cotton and rayon textiles.)

Mildew-resistant paper can be made from wood chips that have been treated by this process. Either the Kraft or sulfite process can be used.

(NCG® preservation processed is licensed by National Cylinder Gas Co., Dept. CP, 840 N. Michigan Ave., Chicago 11, Ill. . . . or for more information check 6852 on form opposite last page.)

Gives information, formulas of chemical specialties

Eight-page report lists over 700 proprietary names for which chemical analyses are available. Eight manufacturing formulas are also listed.

Report is issued by Chemical Specialties Research Laboratories, Dept. CP, PO Box 33 Ansonia Station, New York 23, N.Y. When inquiring specify 6853 on form opposite last page.

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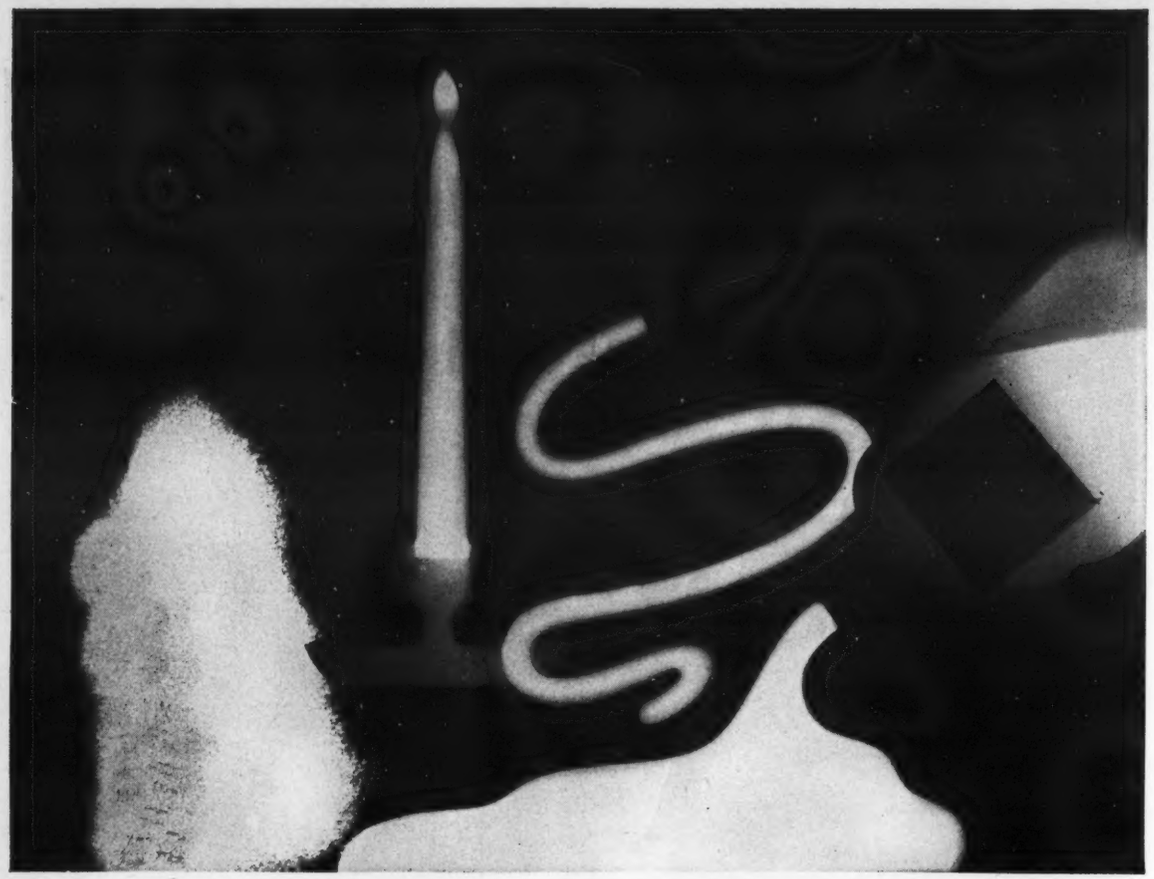

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- In color stability tests, Neo-Fat 18-54 scores 3.7R-16Y on a 5¼" Lovibond scale.
- Sulfuric acid stability test (3 drops of concentrated sulfuric acid in 50 grains of fatty acid) rates Neo-Fat 18-54's initial and final color Gardner at 1.0.

Peroxide Index is nil—even after a year's storage! Odor is bland. Other prime values are low ash content, minimum unsaponifiables, good crystalline structure.

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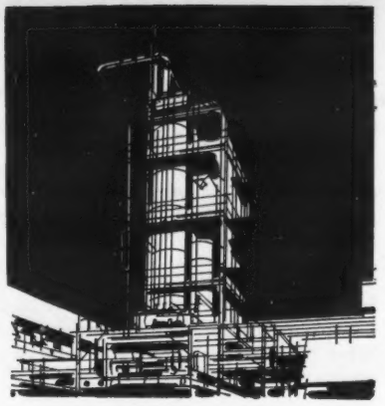
SPECIFICATIONS	Min.	Max.
Iodine Value	5	7
Acid Value	208	211
Titer °C.	53.9	54.4
Color Lovibond (5¼)	—0.7R-3Y	
Unsaponifiable %	—	0.7
Moisture %	—	0.5

AVERAGE COMPOSITION	
Palmitic Acid	51%
Stearic Acid	43%
Oleic Acid	6%

When inquiring check 6855 opposite last page



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Neo-Fat 92-04 Low Titer White Oleic
94-04 Low Titer Red Oil
94-10 High Titer Red Oil

Make corrosion-resistant finishes from a fumaric acid polyester of alkylene oxide condensate . . .

here are two suggested finish formulations that use this resin

A resin which until recently was only used in the reinforced plastics industry is causing a stir in the paint industry as a base for corrosion-resistant finishes. Resin, called Atlac 382, is a fumaric acid polyester of an alkylene oxide condensate of Bis Phenol A.

A formulation which produces a tough film that is highly resistant to acids and alkalis is suggested as a starting point for further development work.

(A) Grind (3 rpm, 2 passes)	
Medium chrome yellow	65
Atlac 382 (50% in Solvesso 100)	35
(B) Mix	
Grind (A)	90
Atlac 382 Solution (60% in xylol)	210
Melmac 245-8	100
Xylol	50

After reduction (3 to 1) with xylol, spray on, air dry for 30 minutes, and bake for 15 minutes at 300°F. Film adheres well to metal.

A second suggested formulation which also requires a 15 minute bake at 300°F is:

Atlac 382 solution (60% in toluol)	100
Resimene 875	43
Chinawood oil	21.5
ATC (50% benzoyl peroxide)	1.4
Cobalt naphthenate (6%)	0.3

This finish has good gloss, toughness, and flexibility. It resists 50% acetic acid, 5% caustic soda, and ammonia.

Atlac 382 resin is a 40-mesh, free-flowing powder. Its acid number is 20 to 25 and its ASTM softening point is about 100°C. It can also be used in wood, wrinkle, and heat resistant finishes.

(Polyester resin is a product of Chemicals Div., Atlas Powder Co., Dept. CP, Wilmington 99, Del. . . . or check 6856 opposite last page.)

Glass making anthology

The story of a company, its products and its people, is told dramatically through selected stories and pictures that have appeared in company's magazine. The story of American glass, men who make glass, and glass in the atomic age are some of the many subjects that are in this 40-page booklet.

"Glassmaker, an Anthology Edition" is issued by Corning Glass Works, Dept. CP, Corning, N. Y. When inquiring specify 6857 on form opposite last page.

the completely new Filteraid for use in strongly alkaline liquors—

The idea of using carbonaceous filteraids in processes involving caustics or fluorides is not new. But NEROFIL—a *processed* carbon-based filteraid—is completely new... and valuable because it overcomes the difficulties often encountered with earlier carbon materials.

(A) is a photomicrograph of a crushed carbonaceous material (quite similar to previous carbon filteraids). This, however, is merely the reactor feed from which NEROFIL (B) is made. Both photomicrographs are the same magnification. The marked differences are evident.

NEROFIL's success as a filteraid stems from two important features. First, of course, its physical and chemical stability... even boiling caustic has negligible effect. Second, the high filter cake porosity and low cake density of NEROFIL yield fast throughput of liquid and superior clarity of filtrate.

This stability and filtration efficiency have led several different industries to adopt NEROFIL in their processing, with excellent results. Complete information on NEROFIL is available to you in a new bulletin, just issued... *write for it.*

Great Lakes Carbon Corporation

Nerofil Department—612 So. Flower St., Los Angeles 17, Calif.
Dept. LTK—333 No. Michigan Ave., Chicago 1, Ill.

When inquiring check 6858 opposite last page

Completely soluble in water, polyglycols have low pour and high solvency . . .

new additions to line have high flash points, good viscosity-temp relationships

Uses: As lubricants in hydraulic brake fluid formulations, as industrial lubricants and in cutting oils, in solvent and plasticizer applications, in cosmetics, and as antidusting agents for dyes. They make good intermediates for surface-active agents.

Features: The two polyglycols are completely water soluble and also have lower pour points and higher solvent power than the polyethylene glycols. High flash points, excellent viscosity-temperature relationships, low surface tensions, and low skin toxicities make these attractive.

Although the products are subject to slow oxidation at elevated temperatures, decomposition products are either volatile or soluble in the polyglycols so that no gums or sludges are formed, as with natural oils.

Description: Polyglycols are polyoxyalkylene ethers containing methyl side chains and terminal hydroxy groups. Polyglycol 15-100 has an average viscosity of 100 cs at 100°F; Polyglycol 15-200 has a 200 cs viscosity at this temp. Other properties:

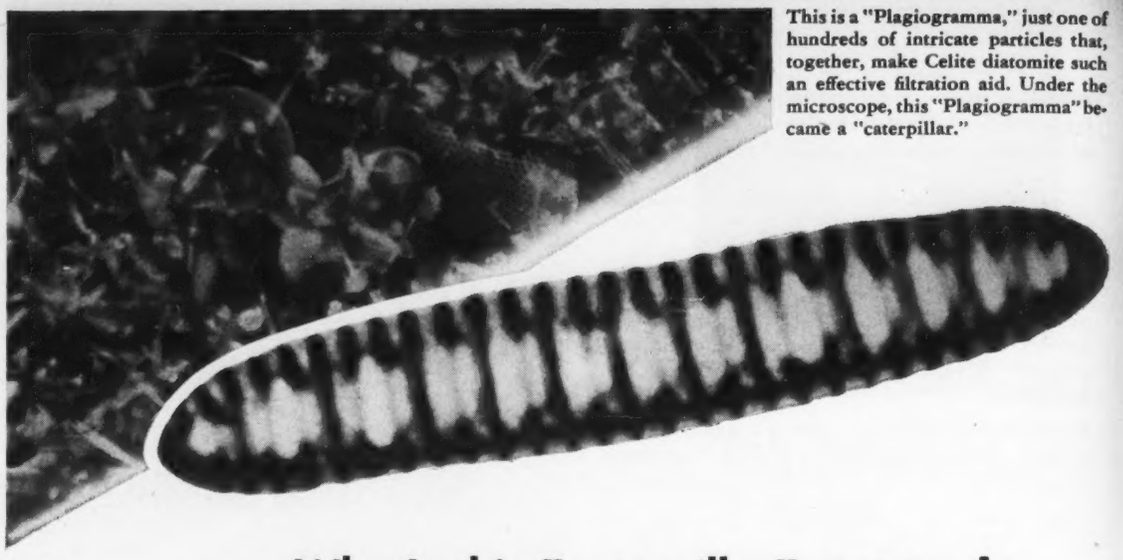
	15-100	15-200
Viscosity (cs)		
@ 100°F	100-110	190-210
@ 210°F	14-15	29- 32.5
Sp gr (25/25°F)	1.064	1.053
Refractive index (n_D^{25})	1.458	1.459
Viscosity index	131	138
Flash point (°F)	510	470
Pour point (°C)	−22	−40
Sp heat (cal/gm/°C @ 25°C)	0.46	0.47
Color (APHA)	150	250
Surface tension (dynes/cm)		
@ 250°C	37.1	36.6
@ 75°C	33.4	32.4

(Polyethylene glycols are products of The Dow Chemical Co., Midland, Mich. . . . or for more information check 6859 opposite last page.)

Textile industry chemicals

Some of the newer uses for textile chemicals are reviewed in 26-page mimeographed booklet. Antistatic agents, wetting and retarding agents for dyeing, dispersing, and pasting agents, solvent components for dyebaths, chemicals for fiber synthesis and modification, surface-active chemicals, and water-soluble lubricants are covered.

Bul F-8679B is issued by Carbide & Carbon Chemicals Co., a div. of Union Carbide & Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. Specify 6860 opposite last page.



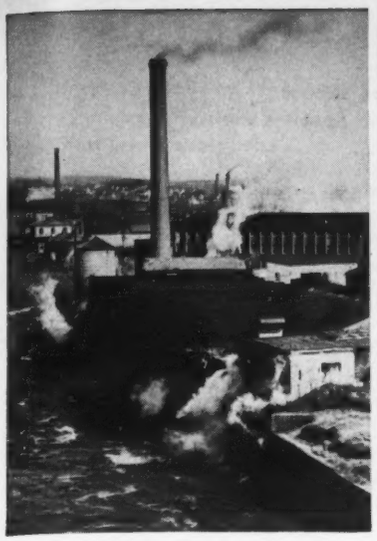
This is a "Plagiogramma," just one of hundreds of intricate particles that, together, make Celite diatomite such an effective filtration aid. Under the microscope, this "Plagiogramma" became a "caterpillar."

What's this "caterpillar" got to do with lower filtration costs?

It's a particle of CELITE that covers more

Assures highest purity in pharmaceuticals

Among the many important uses of Celite diatomite filter aids in industry today is the vital part they play in the production of life-saving antibiotics. Not only does Celite safeguard the purity of aureomycin, streptomycin and other pharmaceuticals; they also provide substantial cost savings that permit wider usage of these *wonder drugs.*



Protects communities from contaminated plant waste

Celite helps control pollution through removal of suspended solids from plant waste waters. Celite treatment often permits plants to reuse this water.

Provides greater clarity in varnish, lacquer and shellac

Celite filtration provides the high degree of clarity required in clear finishes. Celite is also widely used by the paint industry as a flatting agent and pigment extender.

Gives appetizing sparkle to syrups, jellies and other foods

Many food processors make an important *sales plus* of the outstanding brilliance that Celite provides. Celite also helps increase juice yields as a pressing aid.

-the diatomite filter aid

filter surface per pound

THAT'S RIGHT. Celite* is the diatomite that gives you superior clarification at fast flow rates PLUS lower wet density. And lower wet density simply means greater surface coverage per pound of Celite. Which means substantial savings to you, for 6 bags of Celite will actually do the work of 7 bags of other diatomites.

And Celite is uniform. Every pound of it comes from Lompoc, California, the world's largest and purest diatomite deposit. Here, J-M technicians process and grade it so that no matter which convenient J-M warehouse you order from, the physical and chemical properties of each grade will never vary.

In addition, from Celite's full line of filter powders you can select the one grade that will give you the clarity you need at the highest flow rate.

So if filtration belongs in your processing operations, it will pay you to call in your local J-M Celite engineer. Backed by Johns-Manville's research facilities and years of practical diatomite experience, he can help you with your filtration problems. Call him today or write Johns-Manville, Box 60, New York 16, New York. In Canada, write 565 Lakeshore Road East, Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

JOHNS-MANVILLE JM PRODUCTS **Johns-Manville CELITE FILTER AIDS**

When inquiring check 6861 opposite last page

Helps remove polyurethane reaction products from metals . . .

stripper is non-corrosive, and may be applied by dip, flow coat, brush, or spray

Uses: To promote removal of polyurethane reaction products from ferrous and non-ferrous metals.

Features: Stripper is non-corrosive, and can be applied by dip, flow coat, brush, or spray. Contact time is short, and solvent wash after stripping gives recoatable surfaces.

Description: Stripper is of solvent type, comes in one and five gallon drums.

(Isothane stripper is a product of Surface Chemicals, Inc., Dept. CP, 1005 Liberty Ave., Pittsburgh 22, Pa. . . . or for more information check 6862 on form opposite last page.)

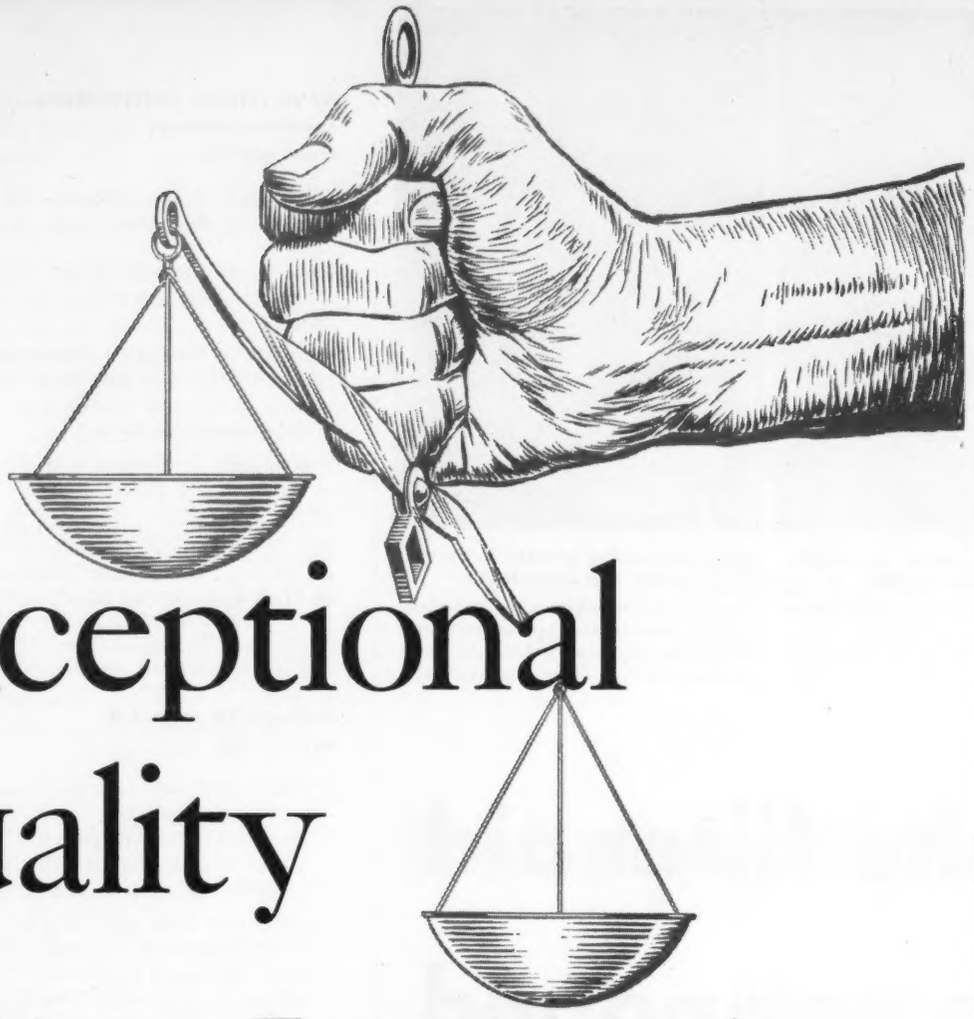
High purity soda ash saves cash

Chemically pure soda ash (sodium carbonate) in tonnage quantities means more $NaCO_3$ for the money, because purity is 99.88%. Spiral-bound 42-page booklet tells the whole story in pictures, text, tables, and graphs.

"Westvaco Soda Ash" may be obtained on letterhead request to Westvaco Chlor-Alkali Div., Food Machinery and Chemical Corp., Dept. CP, 161 E. 42nd St., New York 17, N.Y.

"Forget the break, Sam, they're starting an intoxication research program with us tomorrow."

Cartoon by Bob Genovesi, The E. Horton & Son Co., Windsor Locks, Conn.



exceptional quality

Mathieson Formaldehyde

Compare your specifications for formaldehyde with our regular production and you'll know why more users have standardized on the Mathieson product. And, rigid quality controls assure high purity *consistently* . . . tank car after tank car, truck after truck.

Mathieson Formaldehyde is supplied in four regular grades—37% inhibited, 37%, 45%, and 50% low methanol—available in tank cars and tank trucks from Morgantown, W. Va. Compare your requirements with our production . . . just call an Olin Mathieson representative.

MATHIESON

MATHIESON CHEMICALS
OLIN MATHIESON CHEMICAL CORPORATION
INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD.

3952

INORGANIC CHEMICALS: Ammonia • Bicarbonate of Soda • Carbon Dioxide • Caustic Potash • Caustic Soda • Chlorine • Hydrazine and Derivatives • Nitric Acid Hypochlorite Products • Muriatic Acid • Nitrate of Soda • Soda Ash • Sodium Chlorite Products • Sulphate of Alumina • Sulphur (Processed) • Sulphuric Acid
ORGANIC CHEMICALS: Ethylene Oxide • Ethylene Glycols • Polyethylene Glycols • Glycol Ether Solvents • Ethylene Dichloride • Dichloroethylether • Formaldehyde Methanol • Sodium Methylate • Hexamine • Ethylene Diamine • Polyamines • Ethanolamines • Trichlorobenzene • Polychlorobenzene • Trichlorophenol

When inquiring check 6863 opposite last page

Makes silicone rubber that meets AM Spec No. 3301B . . .

can be molded, extruded, or calendered

Uses: As a compound for making products that meet Aeronautical Materials Spec 3301B.

Features: Silicone resists high temperatures, and has very low compression set and low moisture pickup. It's easy to handle, too.

Description: Silicone rubber compound is called X-1034R, comes in 25 or 50 lb cartons. Uncatalyzed, fabricator can select catalyst best suited for his purpose. For example, DTBP (di-*tert*-butyl peroxide) can be used for thick sections. Compound is red, has hardness of 40 Duro. It can be molded, extruded, or calendered.

(Silicone rubber compound is a product of Silicones Div., Union Carbide & Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. . . . or for more information check 6864 on form opp. last page.)

WANTED: BUDDING CARTOONISTS!

CHEMICAL PROCESSING is in the market for cartoons (and cartoon ideas). They should touch on some aspect of chemical plant or lab work.

Worth $10—Cartoons in black ink on 8½ x 11" sheets—ready to reproduce—will be bought for $10, paid on acceptance.

Worth $5—Cartoons *ideas* . . . a written description or rough sketch of scene, and a caption . . . worth $5, on acceptance.

Send your gag material to:

Cartoon Editor, CHEMICAL PROCESSING
111 East Delaware Place
Chicago 11, Illinois

Be sure to include your name, position, company, and address.

Inert siliceous aggregates of extremely light weight find interesting uses . . .

thermal insulation, filler, insecticide carrier, anti-caking uses seen

Uses: As thermal insulation, filler or thixotropic agent in epoxy resins, anti-caking agent, packaging material, insecticide carrier, and parting agent.

Features: A low "K" factor for the light weight aggregates gives them good insulating properties for either hot or cold applications. They can be used as a fill or mixed with a binder.

Anti-caking properties make the aggregates good for fertilizers and as earth conditioners. The irregular particle shapes and large exposed surface area are of value when aggregates are used as a carrier for insecticides.

Description: Called Ryolex, aggregates are extremely lightweight, inert siliceous material produced by expanding perlite ore, a volcanic lava found extensively in the Rocky Mountain area.

Manufacturing process can be adjusted to give various size and densities. Packaging is in four cu ft bags. Eight grades are available. One of these is grade No. 3-S, which has an average loose-fill density of 2.7 lb/cu ft and a "K" value of 0.240. About 80% by volume passes 30 mesh. Another, grade 8-T is the lightest weight industrial aggregate presently available. Average loose-fill density is 2.0 lb/cu ft. About 80% (by vol) is retained on a 30 mesh screen.

(Light weight aggregates are products of Silbrico Corp., Dept. CP, 5901 W. 66th St., Chicago 38, Ill. . . . or for more information check 6865 on form opposite last page.)

Sees triallyl citrate monomer as cross-linking agent for polyester resins . . .

will also polymerize to a hard thermoset

Uses: In the plastics industry as a cross-linking agent for polyester resins. It will also polymerize to a hard, brittle thermosetting polymer.

Features: Compound is highly unsaturated and very reactive.

Description: Triallyl citrate is made by fermentation processes. Compound is immiscible with water, miscible with acetone, benxene, chloroform, dioxane, ethanol, and glacial acetic acid.

(Triallyl citrate is a product of Chas. Pfizer & Co., Inc., Dept. CP, 630 Flushing Ave., Brooklyn 6, N.Y. . . . or for more information check 6866 on the convenient Reader Service slip which is located opposite last page.)

D
PROGRESS THROUGH CHEMISTRY
Microphotograph showing Davison's Hydrogel enlarged 20 times actual size.
DAVISON
...partner in product development
Davison Engineers have a long record of working with manufacturers in the development of new products as well as solving problems on products currently in production. One such case is the use of Davison's Code 91 Hydrogel for imparting porosity in rubber products. This application required a product of high purity with a narrow total volatile control. The particle size had to be of definite consistency and a close control of the pH range was required. Davison Engineers worked on the problem with the manufacturer and developed Code 91 Hydrogel which is being used successfully and economically to meet the rigid specifications.
This is only one of the many cases in which Davison Engineers have been able to help a manufacturer solve a problem.
See your Davison Field Service Engineer today and discuss your manufacturing problem with him. Let the Davison Engineer be your partner in product development.
DAVISON CHEMICAL COMPANY
Division of W. R. Grace & Co.
Baltimore 3, Maryland
GRACE
Sales Offices: Baltimore, Md.; Chicago, Ill.; Columbus, Ohio; Houston, Texas; New York, N. Y.
Producers of: Catalysts, Inorganic Acids, Superphosphates, Triple Superphosphates, Phosphate Rock, Silica Gels and Silicofluorides. Sole producers of DAVCO® Granulated Fertilizer.
When inquiring check 6867 opposite last page

New
TETRAHYDROFURAN
Economical When Used With
SOLVENT RECOVERY

THF—tetrahydrofuran—has an unusually high solvent action for the high molecular weight polyvinyl chloride resins. Using THF as the active solvent, these hard-to-dissolve vinyl polymers can be used to produce excellent top coatings, plastic sheeting, stronger films and other protective coatings.
Coupled with a Barnebey-Cheney Package Solvent Recovery System, this superior solvent can still be economical. THF can be recovered for re-use again and again for only 8c per gallon—the direct operating cost of a B-C solvent recovery system. This is similarly true of other expensive solvents.
To get the full story, write for the free bulletin: "Solvent Recovery Actually Takes Dollars out of the Air."

BARNEBEY-CHENEY
Company
CASSADY AT EIGHTH COLUMBUS 19, OHIO

In Canada: BARNEBEY-CHENEY LTD., St. Johns, Quebec
When inquiring check 6868 opposite last page

PREFERRED FOR
PAINT
PRODUCTS
Tamms

SILICA
Amorphous, Crystalline and Diatomaceous in various grades for paints, fillers and enamels.

MAGNESIUM SILICATE
A finely ground, very white extender pigment and suspension medium.

CHINA CLAY AND KAOLIN
The purest, smoothest and whitest clays produced. Ideal for pastes and cements.

WHITING
Imported and domestic grades for paints and fillers and also for the pottery trades.

DIATOMACEOUS EARTH
A special grade for paint grinders' use as a suspension and flatting agent.

ALSO MINERAL BLACK AND RED OXIDE

Send for prices and samples.

DEPT. RM-75
TAMMS INDUSTRIES, INC.
228 N. LA SALLE ST., CHICAGO 1, ILL.

When inquiring check 6869 opposite last page

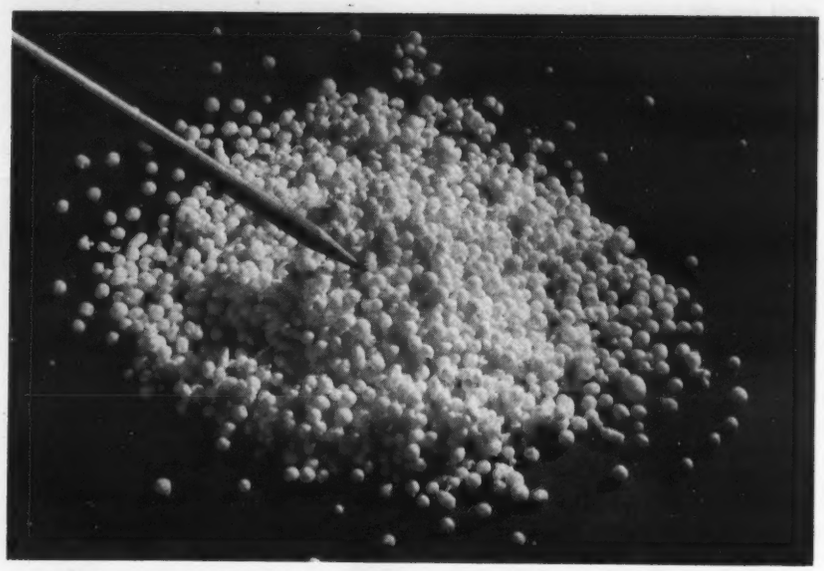


Fig 1—Partly expanded polystyrene beads. When fully expanded, they'll be 40 times their original size

expanded polystyrene has low density, structural rigidity

Expanded structures have smooth, tough skin which can be painted

Uses: As an expandable, or expanded, polystyrene material for use as a thermal and electrical insulation, laminating material, and in packaging, advertising displays, and toys. A big use is anticipated in floats, because of the material's low density and water resistance.

Features: Expanded material has a smooth, tough skin which can be used without coating, or can be sprayed or painted with conventional coatings. In addition to being non-toxic and odorless, structures are fungus-resistant and can be cut or sawed. Dielectric constant and loss factor are low.

Description: Expanded polystyrene is made by a process licensed from Badische Anilin & Soda-Fabrik A.G. of Ludwigshafen A/R, West Germany.

When expanded, material is not a foam, but is composed of individual cells fused together. Its color is white. Foams are non-dusting and non-abrasive.

Besides being supplied as beads (for do-it-yourself expanding), molded structures are available in lengths up to 12 ft, widths up to 4 ft, and thicknesses up to 8 in. Densities can range from one to 20 lb/cu ft. Physical properties of a structure having a density of 1.24 lb/cu ft are given in the table.

(Uni-Crest expanded polystyrene and "beads" are products of United Cork Companies, Dept. CP, South Kearny, N. J. . . . or for more information check 6870 on form opposite last page.)

typical physical properties
OF UNI-CREST EXPANDED POLYSTYRENE
HAVING 1.24 LB/CU FT DENSITY

Tensile strength (psi)	44
Compression strength (psi)	16-20
Energy absorption (max, in-lb/cu in)	29.7
Sp gr	0.02
Water absorption (% by volume)	<0.5
Water vapor transmission rate (g/sq m/in/24 hr)	4.25
Coefficient of thermal expansion	0.000027
Thermal conductivity (K in Btu/-hr/sq ft/°F/in)	0.23-0.25

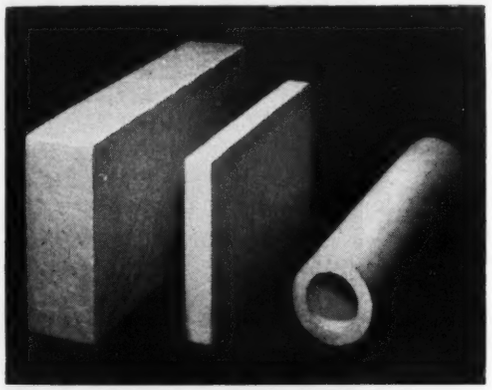


Fig 2—Bricks, sheets, or pipe: three of the final forms expanded beads can take

Fig 3—Thin sections of low density foam have good flexibility, can be installed around curved surfaces

News about

B.F.Goodrich Chemical *raw materials*

Piping that won't corrode; carries oil, acids, chemicals . . . made from Geon rigid vinyl

GEON rigid vinyl is an exceptional material used by leading producers of pipe and fittings to provide cost-cutting installations.

Geon-made piping is immune to galvanic corrosion, eliminating the major source of failure in underground lines. It has superior resistance to oil, acids, alkalis, and most chemicals . . . including attack by sour crude oil, salt water and corrosive fumes.

The smooth interior surface of Geon vinyl pipe reduces frictional head loss, and inhibits the buildup of deposits . . . adding years of maintenance free life. You'll find the light weight and simple assembly of rigid vinyl piping provide important savings in freight, time, and labor.

For a new booklet on specific properties of Geon materials for rigid vinyl piping, write Dept. DD-4, B. F. Goodrich Chemical Company, Rose Bldg., Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

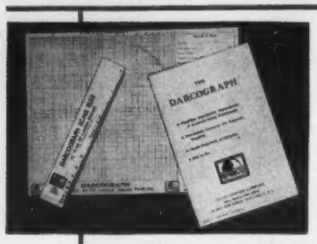
B.F.Goodrich GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

When inquiring check 6871 opposite last page

technical data from

ATLAS

CHEMICALS DIVISION
ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE
Atlas Powder Company, Canada, Ltd., Brantford, Ontario, Canada



...for the CHEMICAL INDUSTRY:
Atlas Darcograph

Here's a helpful guide to the use of activated carbon for removing impurities in any liquid by an adsorption process. The Darcograph is a device providing a ready means of plotting an adsorption isotherm which relates carbon dosage to impurity removal. The process operator needs only to determine the final color or impurity concentration desired, then he reads from the chart the DARCO dosage needed to purify this predetermined allowable level. Check "Darcograph" on the coupon below.

...for PAINT MANUFACTURERS:
ATLAC® 382 polyester resins

ATLAC 382 is a *different* kind of polyester, with improved chemical and heat resistance, and low odor level. It has been successfully used in several coatings, notably paper laminates for electronic and electrical applications. Because of the paint industry's interest in ATLAC 382 as a possible ingredient of finishes, Atlas Research has developed guide formulations which might be used as a starting point for further development by paint chemists. Some of the formulas are included in this recent Atlas Product Information Bulletin. Check ATLAC 382 on the coupon below.

...for CHEMICAL SPECIALTY MANUFACTURERS:
RENEX® 20 detergent as a spotting agent

RENEX 20 synthetic organic detergent is an excellent "spotting agent" for use on fabrics of man-made fibers, as well as on cotton. The use of this Atlas product as a spotting agent is a cooperative development of Atlas and E. I. du Pont de Nemours & Co., Inc. RENEX 20 has proved especially effective in the removal of heavy soil from collars and cuffs in laundering. It is offered to specialty manufacturers for compounding and packaging in tubes, spray containers, or squeeze bottles. A paper, "New Technique for Applying Detergents as Spotting Agents," includes guide formulas and test data. Check RENEX 20 on the coupon below.

ATLAS POWDER COMPANY
Dept. ASP, Wilmington 99, Delaware

Please send me the Atlas data checked below.

*Name*_____ *Title*_____ ☐ *Darcograph*

*Company*_____ ☐ *ATLAC 382 (paint)*

*Address*_____ ☐ *RENEX 20*

*City*_____ *Zone*_____ *State*_____

When inquiring check 6872 opposite last page

Two compounds show promise as textile lubricants . . .

cyclohexyl oleate is also intermediate for plasticizers

Cyclohexyl stearate, $C_{24}H_{47}O_2$, is a lubricant in textile formulations. Non-toxic, compound has 95% purity, melts from 40-43°C.

Cyclohexyl oleate, $C_{24}H_{45}O_2$, is also a textile lubricant as well as being an intermediate in making plasticizers, by epoxidizing the double bond. Compound boils at 265-275°C at 2-3 mm (Hg) pressure. It is 95% pure and is non-toxic.

(Compounds are offered in developmental quantities by Abco Chemical Co., Dept. CP, 2316 Atlantic Ave., Brooklyn 33, N. Y. . . . or for more information check 6873 on form which is located opposite last page.)

Radioactive carbon compound for biochemical uses

Uses: In studies of amino acid formation and metabolism, allergic reactions, and general body physiology by biochemists, physiologists, and pharmacologists.

Features: Compound is "tagged" with C^{14}.

Description: Histamine (2-*ring*-C^{14}) dihydrochloride has activity of one millicurie/millimole. There are four package sizes from one millicurie to 0.05 millicurie available under regular AEC licensing procedures.

(C^{14} compound is available from Nuclear Instrument and Chemical Corp., Dept. CP, 229 W. Erie St., Chicago 10, Ill. . . . or for more information check 6874 on form opposite last page.)

Gives thickening properties of sodium polyacrylates

Synthetic aqueous solutions of sodium polyacrylate are recommended as stabilizers, protective colloids, and thickeners for natural and synthetic rubber latices, and polymeric dispersions such as polyvinyl acetate and polyacrylate emulsions. In addition to specifications, their unique adhesive, suspending, emulsifying, and film-forming characteristics are described in this six-page technical bulletin. Five tables and three graphs accompany the text.

Bul P-27A "Polyco Acrylic Thickeners" is issued by Polyco Dept., Chemical Div., The Borden Co., Dept. CP, 350 Madison Ave., New York 17, N.Y. When inquiring specify 6875 on form opposite last page.

GREENS

4 Pure Chromium Oxides
and
2 Hydrated Chromium Oxides

Most stable of the green pigments. Unaffected by acids, alkalis, vehicles, and solvents. Non-fading.

The 4 pure chromium oxides will withstand ceramic temperatures. Use them in applications requiring permanency—enamels, emulsion paints, rubber, plastics, floor coverings, roofing granules, building materials, etc.

Use the 2 hydrated chromium oxides for obtaining brilliant color and transparency in automotive finishes, high grade enamels and lacquers.

Your nearest Williams representative will be glad to provide you with full technical data and samples.

WILLIAMS
COLORS & PIGMENTS
EASTON, PA. • E. ST. LOUIS, ILL.
EMERYVILLE, CAL.

When inquiring check 6876 opposite last page

Growth of bacteria and fungi inhibited by compound . . .

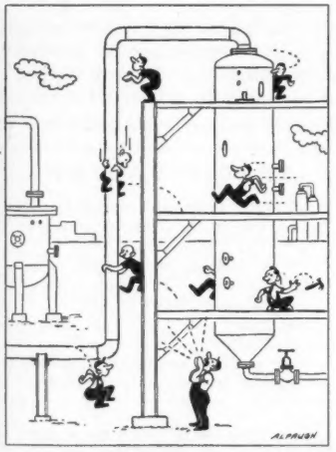
useful in preserving paints

Uses: Applications where commodities are deteriorated by bacteria or fungi.

Features: Compound inhibits the growth of bacteria and fungi. It should be useful in paints, pastes, or cosmetics.

Description: Dehydroacetic acid is a substituted pyran. Toxicity is relatively low.

(Dehydroacetic acid is available from Aceto Chemical Co., Inc., Dept. CP, 40-40 Lawrence St., Flushing 54, N.Y. . . . or for more information check 6877 on form which is located opposite last page.)



"Lunch time!"

Thanks to Mrs. Ann Alpaugh, Vulcan Engineering Division, The Vulcan Copper and Supply Co., Cincinnati, Ohio.

For more information on product at right, specify 6878 . . . see information request blank opposite last page.

from GAF...high pressure acetylene derivatives with 3 centers of reactivity

$HC{\equiv}CCH_2OH$ Propargyl Alcohol

a chemical intermediate and corrosion inhibitor

NEW: ELIMINATES HYDROGEN EMBRITTLEMENT

Low concentrations of propargyl alcohol in acid pickling baths inhibit or completely eliminate hydrogen embrittlement. Bend angles of 180° are obtained in a modified Zapffe method of testing. A special data bulletin is available on request.

Concentration of Inhibitor Based on Acid Content, Per cent by Weight	DEGREE OF ARC OBTAINED			
	Propargyl Alcohol	2-butyne-1, 4 diol	Commercial Inhibitor "A"	Commercial Inhibitor "B"*
0.00	69	69	69	69
0.25	180	48	43	68
0.5	180	54	36	180
1.0	180	59	77	123
2.0	180	150	103	145
4.0	180	123	66	133
8.0	180	130	133	180

*Contains 11% propargyl alcohol.

chemical intermediate:
Propargyl alcohol, $HC{\equiv}CCH_2OH$, with its three centers of reactivity, primary alcohol, triple bond and active hydrogen, has proven itself a valuable tool in the synthesis of pharmaceuticals, essential oils, agricultural and specialty chemicals.

corrosion inhibitor:
Propargyl alcohol is an excellent corrosion inhibitor for mineral acids and stabilizer for chlorinated solvents.

properties:
Propargyl alcohol is a colorless, stable liquid, infinitely miscible in water, benzene, ethanol and other organic solvents.

$HC{\equiv}CCH_2Br$ Propargyl Bromide

a chemical intermediate and agricultural soil sterilizer

chemical intermediate:
Propargyl bromide, $HC{\equiv}CCH_2Br$, has three centers of reactivity; triple bond, bromine atom, and acetylenic hydrogen. Synthesis of terpinoid structures such as vitamin A, plant growth hormones, etc., is possible through Reformatsky-type reactions. Some propargyl amines and propargyl ethers synthesized from propargyl bromide have physiologic activity as morphine antagonists and hormones. Used in the synthesis of propargyl substituted barbiturates.

soil fumigant:
Propargyl bromide has been found to be highly effective as an agricultural soil fumigant.

properties:
Almost colorless liquid, insoluble in water, soluble in ethers, benzene and hydrocarbons.

For technical information, price schedules and samples write to:

ACETYLENE CHEMICALS DEPARTMENT
ANTARA CHEMICALS
A SALES DIVISION OF
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435 HUDSON STREET · NEW YORK 14, NEW YORK

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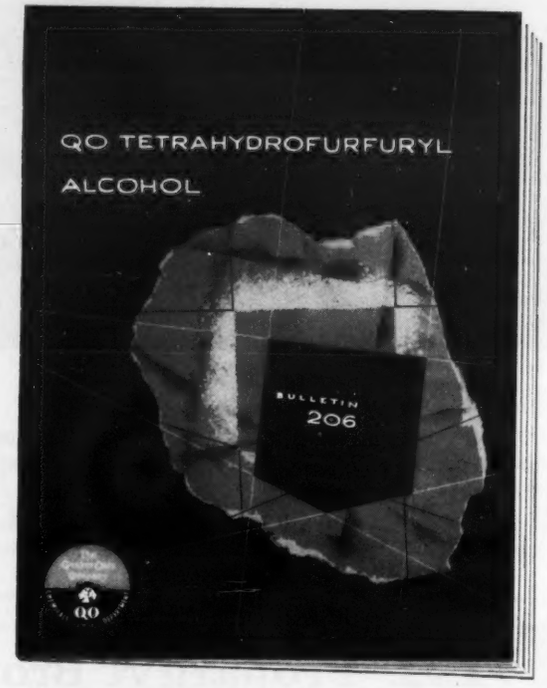
From Research to Reality

New Quaker Oats' Bulletin on

THFA®

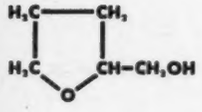
(QO® TETRAHYDROFURFURYL ALCOHOL)



NEW BULLETIN HELPS YOU DECIDE:

"Can I use it?"

"How?"



THFA is the "new angle" in many plants—as a chemical intermediate in the development of new products, or a solution to production problems. THFA is for you—it's finding new, important applications. Chemistry, physical properities and uses of THFA are all discussed in our new Bulletin 206.

Write for "THFA Bulletin 206"

IMPORTANT NOTICE Investigate new low price made possible by new process.

The Quaker Oats Company — QO Furan Chemicals — Chemicals Department

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Sales Representatives in Most Principal Countries

When inquiring check 6879 opposite last page

MATERIALS

Describes chromium chemicals in pocket-size booklet

Principal uses, complete specifications, and safe handling instructions for sodium bichromate, sodium chromate, and potassium bichromate are described in 10-page, pocket-size booklet. Two-color publication contains brief history of company and a description of chromium compounds in general.

Bul A905 is issued by Columbia-Southern Chemical Corp., Div. of Pittsburgh Plate Glass Corp., Dept. CP, 632 Fort Duquesne Blvd., Pittsburgh, Pa. When inquiring specify 6880 on form opposite last page.

Granular form of pyrophyllite is inert, nonhygroscopic, has low absorption . . .

offers these advantages to makers of granular agricultural insecticides, fungicides

Uses: Granular pyrophyllite should find its major use in granular agricultural insecticide and fungicide preparations. It is also expected to be used in roofing, non-slip coatings, and percolation and filter beds.

Features: The granular mineral offers these advantages in granular insecticides and fungicides. Its low absorption permits complete release of the toxicant without loss due to irreversible binding with the base. Its inert nature and neutral pH assure toxicant stability. Since granules are non-hygroscopic, product will not become sticky or slippery in storage or use.

Description: Initial production is in 8/20, 10/30, and 30/60 mesh sizes, packed in 50-lb multiwall bags. Pyrophyllite is a mineral with formula $Al_2O_3 \cdot 4SiO_2 \cdot H_2O$.

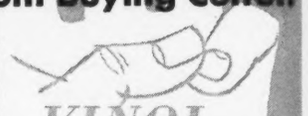
(Pyrax granular pyrophyllite is a product of Specialties Dept., R. T. Vanderbilt Co., Dept. CP, 230 Park Ave., New York 17, N.Y. . . . or for more information check 6881 on form opposite last page.)

Organic chemicals for industry described in detail

Polyols, surface active agents, and polyester resins are among products discussed in eight-page catalog. Over 80 surface active agents are described. Uses, general properties, and a brief description are included for each item.

Bul CD-91 is issued by Atlas Powder Co., Dept. CP, Wilmington 99, Del. When inquiring specify 6882 on form opposite last page.

Polyvinyl Alcohol users can count on Big 3 Benefits from buying Colton



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Colton chemists are ready, willing and able to show you the advantages in product improvement and cost reduction of Vinol Polyvinyl Alcohol . . . for water soluble films for up-to-the-minute packaging . . . for new paper and textile coatings . . . as an emulsifier for producing stable emulsions of many resins . . . as a binder in industrial ceramics.

Write now for samples and data to Dept. C8

SPECIFICATIONS

VINOL Polyvinyl Alcohols now available in the following grades:
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(88% hydrolyzed)
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(99+% hydrolyzed)
Low, medium, medium high and high viscosity fully-hydrolyzed grades.

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Products of other divisions of Air Reduction Company, Inc. include: AIRCO, industrial gases, welding and cutting equipment • PURECO, carbon dioxide, liquid-solid ("DRY-ICE") • OHIO, medical gases and hospital equipment • NATIONAL CARBIDE, pipeline acetylene and calcium carbide.

When inquiring check 6883 opposite last page

Casein solution resists spoilage in its natural state and in coatings . . .

storage life is unlimited under normal conditions, and freezing does not harm it

Uses: As a prepared stabilizer, thickener, and leveling agent in latex and emulsion paints and in paper coatings.

Features: Biologically stable, casein is resistant to spoiling in its natural state and in formulations. Lengthy test results show absolutely no biological decomposition when all preservatives were eliminated from the paints. However, a loss in viscosity was noted, so company recommends that preservatives be reduced by half whenever this stable casein is used to replace any other form of casein.

Storage life of this prepared stabilizer is unlimited under normal conditions, and it is unharmed by freezing.

Description: Cascoloid ST-50 is a 25% casein solution. The white liquid weighs 9.7 lb/gal and is dilutable with water. It contains 50 to 53% total solids, and can be added to the pigment grind or to the pigment slip or divided between the two. Biologically stable casein is more readily soluble in water with alkalis than is conventional casein, and it can cold cut without difficulty. Material is in pilot plant production at present.

(Biologically stable casein is a product of Casein Dept., Chemical Div., The Borden Co., Dept. CP, 350 Madison Ave., New York 17, N.Y. . . . or for more information check 6884 on form opposite last page.)

Uniformity chief advantage of synthetic egg yolk for tanning . . .

has long storage stability and better odor than egg yolk

Uses: Product is currently being used in tanning and other industries.

Features: Chief advantage of this material over conventional egg yolk is that it is uniform. Product also has long storage stability. Also the usual disagreeable odor associated with egg yolk is not present.

Description: Only one-fourth as much of the synthetic egg yolk is required as conventional egg yolk for the same job. Product can be applied within a temperature range of 90-130°F.

(Synova synthetic egg yolk is product of Seaboard Chemicals, Inc., Dept. CP, PO Box 333, Salem, Mass. . . . or for more information check 6885 on form opposite last page.)

Now! VINYL foam ...so versatile, it can be varied to meet your needs!

because it's made of Firestone

A totally new foam product with exceptional durability, economy and, most of all, *versatility*—became possible through the development of the vinyl plastisol resin. (Exon 654 in the Firestone line of vinyls.)

Vinylfoam is produced by the Elastomer process, using Exon 654 as the base resin.

Molded in cored or slab form, it can be modified at no extra cost to be as soft or as firm as you need, as light or as heavy, as thick or as thin, as resilient or as "dead."

It can be electronically heat-sealed without affecting any of its properties.

Exon 654 makes Vinylfoam exceptionally resistant to abrasion, corrosion, flame, aging, moisture, tearing and chemical action. With maximum dimensional stability, it resists oxidation, hardening and drying out.

It can be embossed, die cut, split or skived; molded directly onto textiles and most synthetics, and onto vinyl sheeting or film in continuous lengths. Mutual surface impregnation forms a homogeneous bond.

Vinylfoam gives products in almost every field new comfort, safety, durability. Vinyl's economy makes them cost less, sell easily.

EXON

VERSATILE VINYL RESINS
engineered answers to industry's needs

Firestone Plastics Company supplies the plastisol resin for Vinylfoam . . . does not make the finished foam itself.

For complete information or technical service on the entire line of Exon resins, call or write today:
CHEMICAL SALES DIVISION
FIRESTONE PLASTICS CO., DEPT. 68K POTTSTOWN, PA. • A DIVISION OF THE FIRESTONE TIRE & RUBBER CO.

When inquiring check 6886 opposite last page

The ring of quality

Colorful, low-cost sidewall rings that can be quickly installed on tires are now contributing to the luxury-look of today's new cars. They're inexpensive, stay brilliant for life, wash bright in seconds, out-last tires. A product of The Bearfoot Sole Co., Wadsworth, Ohio, these rings are available in a variety of colors or in white. They're made of Enjay Butyl Rubber because no other rubber tested could equal its performance in severe laboratory and road tests. The Enjay Butyl label on the Flex-A-Wall® carton assures the buyer of outstanding quality.

Find out for yourself the many technical advantages of Enjay Butyl—the rubber that is outperforming natural and other types of rubber in a wide variety of industrial and consumer applications. For full information, and for technical assistance in the use of Enjay Butyl, write, wire or phone the Enjay Company.

ENJAY BUTYL

ENJAY *Pioneer in Petrochemicals*

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Enjay Butyl is the super-durable rubber with *outstanding* resistance to aging • abrasion • tear • chipping • cracking • ozone and corona • chemicals • gases • heat • cold • sunlight • moisture.

When inquiring check 6887 opposite last page

MATERIALS

Made under mild conditions, anion exchange resin trio gain stability, long life

They can handle larger molecules, withstand organic fouling

Uses: Exchange resins are designed for complete two-resin decolorization of sugar, concentration of uranium from acid leach liquors, production and purification of pharmaceuticals, and production of high-quality boiler feed water.

Features: Resin has true porosity and a known, controllable degree of cross-linking. This gives longer life, ability to handle larger molecules, greater resistance to organic fouling, and more reproducible results. Since these resins are made under relatively mild conditions, they have greater stability and contain less extractable residues than conventional strong-base anion exchange resins.

Description: Manufacturing process does not employ commercially available polyvinyl compounds to cross-link the basic polymer. No details of the activating conditions are given, but manufacturer states these conditions are less severe than those employed in chloromethylation, the conventional activation process. This manufacturing process eliminates "skin effect," which is usually associated with resins in bead form. "Skin effect" is a thin coating of hard polymer surrounding the active interior. Three resins are presently available: A-101 and A-102, which are strongly basic, and A-114, a weak base. Cost is about $75/cu ft, about that of conventional high-porosity anion exchange resins.

(Duolite exchange resins are products of Chemical Process Co., Dept. CP, Redwood City, Calif. . . . or for more information check 6888 on form opposite last page.)

Studies mixing of pelleted ZnO in Banbury mixers

Eight-page technical report supports conclusion that pelleted zinc oxide is incorporated quicker and with less power consumption than non-pelleted zinc oxide. Studies were of a 70-30 ZnO-rubber masterbatch in a lab Banbury mixer. Effects of ram pressure, stearic acid and temperature, and loading were investigated.

"Mixing Studies of Pelleted Zinc Oxide in a Banbury" is available from The New Jersey Zinc Co., Dept. CP, 160 Front St., New York 38, N.Y. When inquiring reader may simply specify 6889 on the convenient Reader Service slip which is located opposite last page.

Makes a silicone rubber cure agent that has the advantages of DTBP with none of the disadvantages . . .

agent locks in di-tertiary-butyl peroxide so it can't evaporate

Uses: Catalyst is designed for curing manufacturer's silicone rubber compounds.

Features: A mixture of DTBP catalyst (di-*tert*-butyl peroxide) in silicone gum, product eliminates the disadvantages that are associated with using liquid DTBP, such as its high volatility. Curing compound disperses easily and quickly and has a minimum shelf life of six months.

Description: Cure agent comes as a stiff white paste containing a combination of silicone rubber gum, a filler, and 5% DTBP, locked in so it cannot evaporate.

To use, mix in a small amount while replasticizing the rubber on the mill. Catalyzed stocks can be held up to two weeks without loss of catalyst.

Vulcanizing 1/8" sections requires 20 min at 340°F followed by 24 hr in an air oven at 480°F. For steam cure of 1/8" sections, 80 psi steam (325°F) for 20 min followed by the same postcure is recommended.

(X-1960 is a product of Silicones Div., Union Carbide & Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. . . . or for more information check 6890 on form which is located opposite last page.)

"It's whut paw calls his 'research department'!"

Vital protection for your products

DOW

A Report to Three Key Industries
ON DOWICIDE PRESERVATIVES

New booklets for the ADHESIVE, PAINT and VARNISH, and PAPER and FIBRE BOARD industries give detailed product protection information

For you who are responsible for maintaining the quality of your firm's products, Dow has prepared these three information-packed booklets on the application of Dowicide® preservatives.

For adhesive—a discussion of mold growth, bacterial attack and odor problems in starch-based, protein-derived and synthetic adhesives. *For paint and varnish*—factors affecting mold development, desirable characteristics of a preservative, and adding preservatives to the product. *For paper and fibre board*—preservatives for manufacturing operations, methods of incorporating preservatives into pulp, paper, and fibre board products.

Dowicide preservatives play equally important roles in other fields of industry—building materials, floor coverings, textiles, leather, petroleum, cosmetics and waxes, to name a few. Many firms have found that Dowicide products pay their own way by increasing production efficiency and assuring product quality.

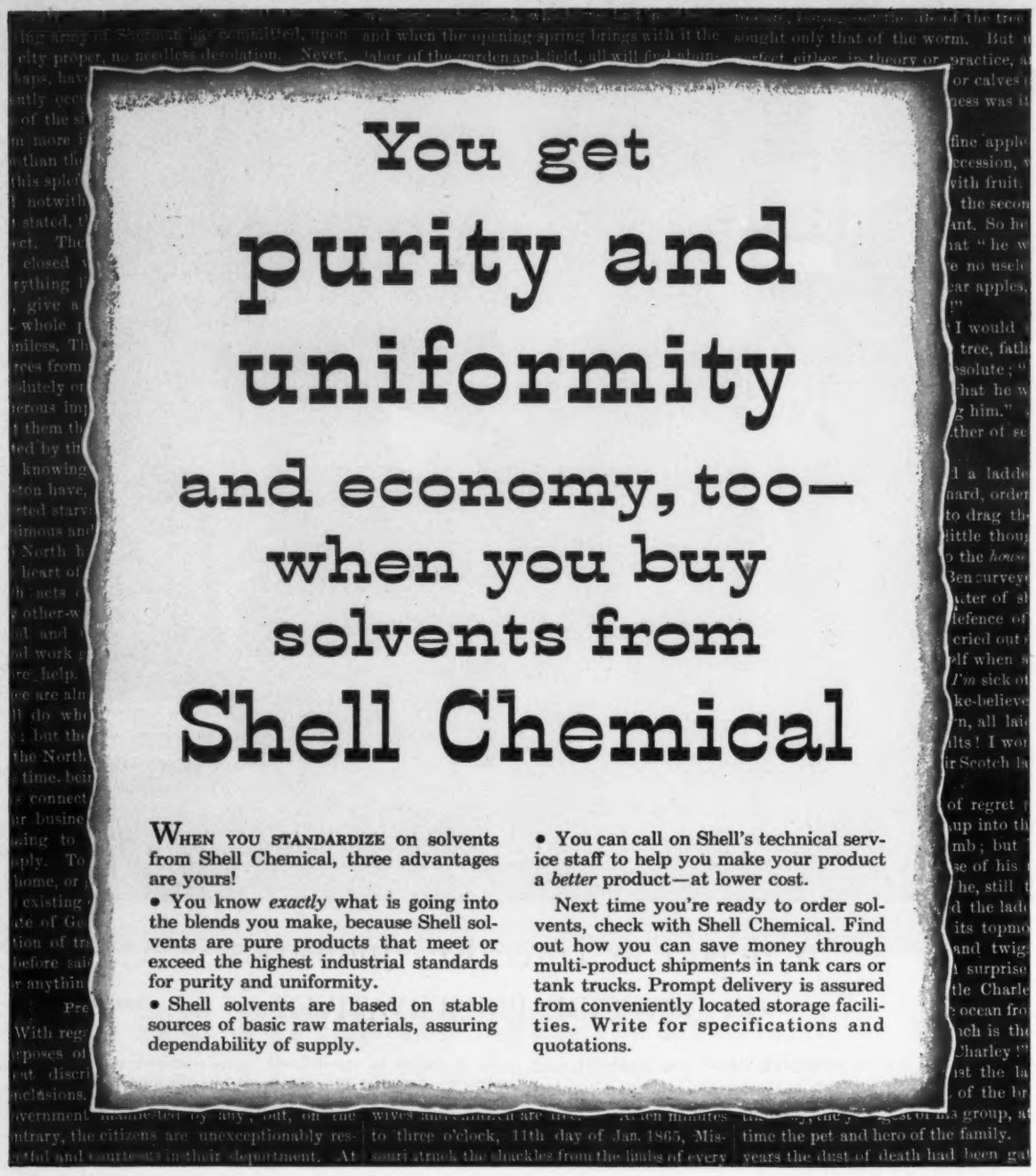
Perhaps your products have an application for one or more of these efficient, versatile preservatives. The Dow laboratories can give you practical technical assistance on your product protection problems. For specific information on this helpful service, write today to THE DOW CHEMICAL COMPANY, Midland, Mich., Dept. DP 962D-1.

THE DOW CHEMICAL COMPANY, Dept. DP 962D-1, Midland, Michigan
Please send me a copy of the Dowicide booklet on
☐ Adhesives ☐ Paint and Varnish ☐ Paper and Fibre Board
☐ Information on my product (My product is _____)
Name _____ Firm _____
Address _____ Title _____
City _____ Zone _____ State _____

you can depend on DOW CHEMICALS

DOW

When inquiring check 6891 opposite last page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IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited • Montreal • Toronto • Vancouver
SHELL

When inquiring check 6892 opposite last page

MATERIALS

Studies show that certain rare earth oxides are promising catalysts . . .

neodymium, samarium oxides predominate

Certain rare earth oxides show promise as catalysts in dehydrogenation reactions, necessary to produce high octane gasolines. Studies also show that rare earths may affect chemical reactions producing synthetic rubber and plastics. The two materials which at present show most promise are the oxides of neodymium and samarium.

(Information courtesy of Dr. Vasili I. Komarewski, professor of chemical engineering, Illinois Institute of Technology, 35 W. 33rd St., Chicago 16, Ill.)

Hydroxylammonium sulfate offered in two grades: high purity and tech

Two grades of hydroxylammonium sulfate (hydroxylamine) are now available. A 95%-pure grade for pharmaceutical and photographic use, and a tech grade for making antioxidants, stabilizers, and related compounds can be obtained. High-purity grade is identified as VHS_{95}; tech grade, as VHS_{60}.

(Hydroxylammonium sulfate is a product of Virginia Smelting Co., Dept. CP, West Norfolk, Va. . . . or for more information check 6893 on form opposite last page.)

Surface chemistry

How surface-active agents may improve processing is one subject covered in 12-page discussion of surface chemistry. Company's service as related to design, synthesis, application, and manufacture of surface-active compounds is outlined.

"Explore, Expand and Diversify with Surface Chemistry" is issued by Foster D. Snell, Inc., Dept. CP, 29 W. 15th St., New York 11, N.Y. When inquiring specify 6894 on form opposite last page.

as you read **chemical processing**

. . . you may be wondering why you have been selected to receive it regularly . . . without subscription charge.

The Editors explain on page 122.

Nondrying paste produces greenish-black shades on cotton, rayon . . .

dye is unaffected by presence of metals in the dyebath

Uses: For dyeing cotton and rayon to greenish-black shades.

Features: Dye is unaffected by presence of metals in the dyebath and is suitable for use on all types of dyeing equipment. It has maximum light fastness in heavy shades, the highest AATCC rating, and excellent fastness to most wet processing, including cross dyeing, stoving, and perspiration.

Description: Anthraquinone vat dye comes as a nondrying paste. It is suitable for production of resin-finished dress goods and suitings, as well as materials that are subsequently rubberized. It is also suitable for printing.

(Carbanthrene Direct Black 3G Double Paste is a product of National Aniline Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N. Y.... or for more information check 6895 on form opposite last page.)

Ethylene imine chemistry

An annotated bibliography of literature on ethylene imine, a versatile intermediate, is given in this 68-page book. Material from 1878 to 1954 is covered. Arranged in chronological order, the 224 entries are indexed by subject and author. An index of patent numbers is given.

"Bibliography on Ethylene Imine Chemistry" is issued by Chemirad Corp., Dept. CP, PO Box 152, Port Washington, N.Y. When inquiring specify 6896 on form opp. last page.

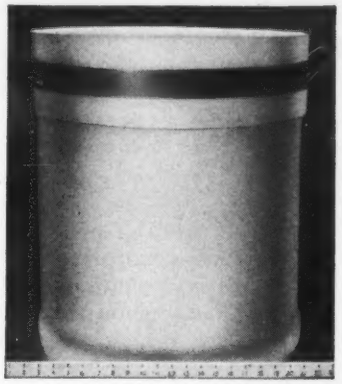
For more information on product at right, specify 6897 . . . see information request blank opposite last page.

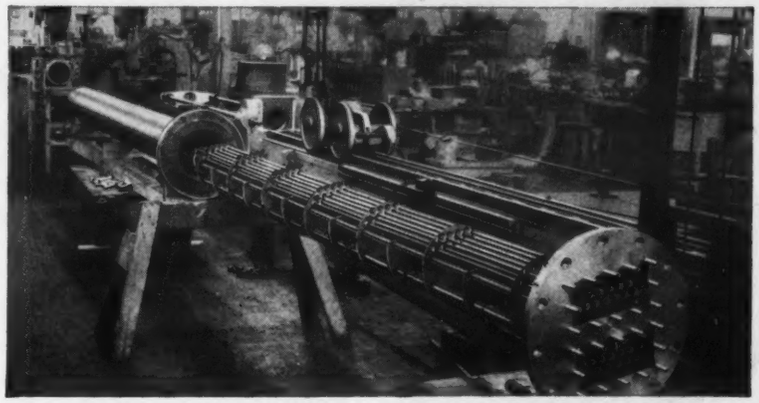
DU PONT

CHEMICAL ENGINEERING NEWS

PROPERTY AND APPLICATION DATA ON THESE VERSATILE ENGINEERING MATERIALS: "ZYTEL," "ALATHON," "TEFLON," "LUCITE."

Heat exchanger handling strong nitric acid utilizes property advantages of Du Pont TEFLON®



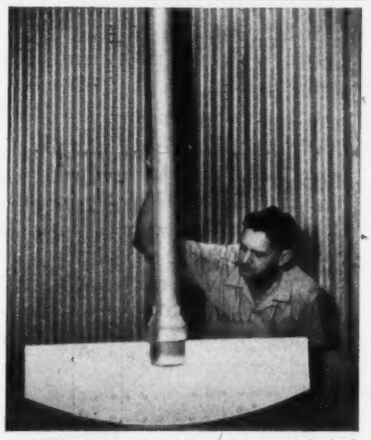


This heat exchanger, manufactured by Fansteel Metallurgical Corporation, North Chicago, Illinois, raises the temperature of strong nitric acid (42-50%) to 350°-375°F. One of the few metallic materials able to stand this strong oxidizing agent is tantalum; one of the few non-metallics is TEFLON.

Tanks made of ALATHON® are portable and chemical-resistant

This 40-gallon-capacity tank developed by the American Agile Corporation, Cleveland, Ohio, is made of ALATHON polyethylene resin. The steel band and handles, which are used to carry the tank, were sandblasted and sprayed with a 1/16" coating of ALATHON to make the entire unit corrosion-resistant.

ALATHON has unusual resistance to chemical reagents. It is substantially unaffected by concentrated hydrochloric or hydrofluoric acids at room temperature. While permeable to certain organic acids and to some solvents and essential oils, it is not altered chemically or mechanically by these materials. The chemical and physical properties of ALATHON remain unchanged with age, assuring long, trouble-free service. ALATHON is light in weight, yet strong and flexible, can be readily heat-welded and is available in the form of film, sheet, tubing, pipe or molded products. For the complete facts on ALATHON, mail coupon.



A blade of TEFLON driven by a steel shaft covered with TEFLON is used in this new agitator designed by John L. Dore Co., Houston, Texas, for stirring corrosive mixtures under pressure. TEFLON replaced conventional glass-covered agitator, because it eliminated the problem of chipping and breaking.

TEFLON tetrafluoroethylene resin was chosen for two critical uses in this U-tube-type heat exchanger: for the grommets, inserted in the steel baffles to support the tantalum tubes, and in the form of rectangular gaskets at the header, or tube sheet.

In the grommet application, TEFLON not only supports the tubes but insulates them electrically from the steel baffle, preventing galvanic action which might damage the tantalum. TEFLON withstands the temperature of 150 to 190 psig steam, and its low coefficient of friction allows free movement of the tubes with expansion and contraction.

The gaskets of TEFLON must serve as insulation, as well as provide an acid-tight seal. The fact that TEFLON is not subject to damage from thermal shock is also important in this application.

To receive complete property data on Du Pont TEFLON tetrafluoroethylene resin, clip and mail coupon.

NEED MORE INFORMATION?

Clip the coupon for additional data on the properties and applications of these Du Pont engineering materials.

E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department
Room 788, Du Pont Building, Wilmington 98, Delaware
In Canada: Du Pont Company of Canada Limited, P.O. Box 660, Montreal, Quebec

Please send me complete property and application data on Du Pont TEFLON ☐ and ALATHON ☐.

I am interested in evaluating these materials for

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FOR MOST EFFICIENT, ECONOMICAL

Liquid Phase Adsorption

Specify Pittsburgh Granular Carbon

If your job is to increase efficiency, reduce costs and produce higher product quality in a liquid phase adsorption process, then you'll want to know *more* about the unique benefits of using Pittsburgh Granular Activated Carbons in a fixed bed column system. Just look at these specific advantages:

1. Far greater capacity, counter-current efficiency and higher product quality as compared with batch methods.
2. Lower carbon dosage—lower costs.
3. Elimination of slurrying, filter cake retention losses and dusting problems inherent in powdered carbon systems.
4. Less equipment—less floor space—less maintenance.

What's *your* liquid phase adsorption problem? Decolorizing a solution? Refining a food product? Purifying a pharmaceutical? *Pittsburgh coal-derived Activated Carbons, used in a column system, will do a better job at lower cost.* And we have the facts to prove it!

You'll find there's a type of Pittsburgh Granular Carbon ideally suited to solve your particular adsorption problem. *A letter or call will bring full information.*

WSW 6081

COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

When inquiring check 6898 opposite last page

Gives typical nitrile rubber cement formulations

Half of this 20-page technical bulletin is devoted to typical compounded Paracril (nitrile rubber) cement formulations. General purpose, self-curing, noncuring, pressure-sensitive, and splice adhesives, and coating cements are covered. Properties, testing, storage considerations, and preparation and compounding are detailed.

Bul No. 9 "Paracril Cements" is issued by Naugatuck Chemical Div., United States Rubber Co., Dept. CP, Naugatuck, Conn. When inquiring check 6899 on form which is located opposite last page.

Good adhesion, negligible shrinkage shown by epoxy pastes . . .

high-strength products cure at room temp, contain no volatile matter

Uses: In ceramic industries for waterproof tile-setting compounds, in electrical industries for coating purposes, in joining large clay sewer pipes, in sealing porous metal castings, and in other functions of a kindred nature. One of compounds available is being successfully used as a "plastic steel" containing up to 80% powdered iron.

Features: Containing no volatile matter, epoxy pastes possess outstanding adhesion and have negligible shrinkage.

Description: Seven epoxy pastes are announced which are high in strength and capable of curing at room temperature. After setting, following the addition of a catalyst, products can be machined, sanded, or drilled.

(Epocast pastes, 150 to 156, are products of Furane Plastics, Inc., Dept. CP, 4516 Brazil St., Los Angeles 39, Calif. . . . or for more information check 6900 on the convenient Reader Service slip which is located opposite last page.)

Gives plasticizer's properties and industrial uses

Properties and characteristics of low-cost secondary plasticizer, compatible with a wide range of resins, are described in technical bulletin. Specific applications as an extender plasticizer in plastisols for slush molding and coatings, in vinyl tile, and in filled extrusions are discussed. Other industrial uses of compound are cited.

Bul 0-104 is issued by Organic Chemicals Div., Monsanto Chemical Co., Dept. CP, 1700 S. Second St., St. Louis 4, Mo. When inquiring specify 6901 on form opposite last page.

Compatible lubricant is stable, won't affect color . . .

wax-silicone emulsion will make good textile lubricant

Uses: In the chemical industry and with textiles, as a lubricant.

Features: Emulsion is compatible with all water-soluble sizes, resins, and gums. It is stable to cold water, acid, and alkali. Color or light fastness are not impaired.

Description: Product is a nonionic microcrystalline wax and modified silicone polymer emulsion, containing 50% solids. Particle size is < 5 microns. Free-flowing white emulsion will not yellow on aging or under heat.

(Wax-silicone emulsion is a product of The Carolina Aniline & Extract Co., Dept. CP, PO Box 2386, Charlotte 1, N.C. . . . or for more information check 6902 on form opposite last page.)

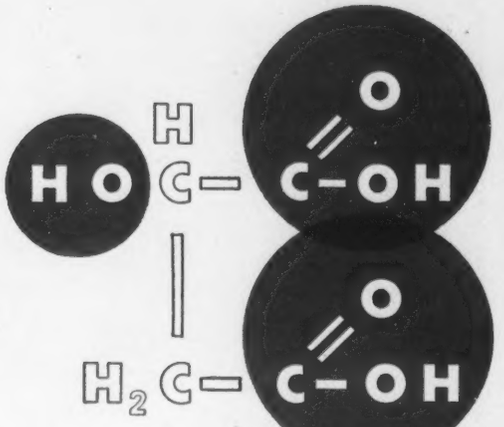
"Toxic fumes, my eye . . . it's that late, late movie on television!"

For more information on product at right, specify 6903 . . . see information request blank opposite last page.

check this list of uses for

MALIC ACID

TECHNICAL



Another Reactive National Aniline Chemical

Made by National Aniline's unique process for 34 years, this versatile tri-functional intermediate finds ever-increasing usefulness in surface coatings, plasticizers and resins. It is widely used to increase adhesion and improve stability of vinyl butyral wash primers, zinc chromate primers, lacquers and lacquer primers.

Other interesting applications for National Malic Acid already described in technical literature include:

. . . ingredient in polyester resins and plasticizers

. . . stabilizer for ethyl cellulose

. . . greening inhibitor in copper lacquers

. . . epoxy resin ingredient for glass coatings

. . . alkyd resin in molded electrical insulation

. . . paper impregnator for electrolytic condensers

. . . dispersing agent in the manufacture of shellac and shellac substitutes

. . . anti-oxidant for synthetic detergents

. . . compatibility agent for fire-retardant finishes

. . . extractant for pectins

. . . electrolyte component for oxidation of aluminum

National Malic Acid is 98.5% minimum acidity, low in ash and insolubles. Complete specifications and working sample are available on request. Our technical staff is ready at all times to work with prospective users.

NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Boston Providence Charlotte Chicago San Francisco Atlanta Portland, Ore. Greensboro Philadelphia Richmond Cleveland Los Angeles Columbus, Ga. New Orleans Chattanooga Toronto

Please send sample of Malic Acid to:

Name _____

Address _____

City _____

D-1

SPECTROGRAPHIC TESTS of Sunoco Propylene Trimer disclose new structural information of interest to chemists trying to reduce costs... increase yields...discover new uses.

LOOKING FOR THE BEST LOW-COST OLEFIN?

No other olefin is potentially more useful, or lower in cost, than Sunoco Propylene Trimer

Recent spectrographic tests of Sunoco® Propylene Trimer show that this C_9 propylene polymer "cut" is composed almost entirely of mono-olefins ...with about 16% of the double bond in the terminal position. Distribution of the olefin types is indicated as follows:

Terminal Olefins:

$R-CH=CH_2$	4%
$\frac{R_1}{R_2}>C=CH_2$	12

Non-terminal Olefins:

$\frac{R_1}{H}>C=C<\frac{H}{R_2}$ (trans)	15
$\frac{R_1}{H}>C=C<\frac{R_2}{H}$ (cis)	3
$\frac{R_1}{R_2}>C=C<\frac{R_3}{H}$	41
Remainder:	25

(Presumably tetra-substituted olefins)

Sunoco Propylene Trimer is butylene-free and low in sulfur. It has a narrow distillation range... eliminates color problems in end products. Producers are obtaining high yields using Sunoco Propylene Trimer in the synthesis of various chemical intermediates such as nonyl phenol and in alkylation reaction with aryl groups in the production of synthetic detergents.

To get your copy of the spectrographic analysis and complete information about Sunoco Propylene Trimer, write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. CP-8.

FREE TECHNICAL BULLETINS ON OTHER SUNOCO PETROCHEMICALS

Benzene • Toluene • Mixed Xylenes • Propylene Tetramer • Sunaptic® Acids (High Molecular Weight Naphthenic Acids) • PDO-40 (Polymerized Drying Oil) • Sulfonate WS (Water Soluble Sulfonates) • Sulfur • Anhydrous Ammonia

SUNOCO

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

PHILADELPHIA 3, PA. © SUN OIL CO.

IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL

When inquiring check 6904 opposite last page

Silicone mold release emulsion gives fine surface detail and good finish . . .

believed to be first stable emulsion for rubber and plastic mold release

Uses: Product is useful in a wide variety of release and other applications — whenever the convenience of emulsion form for applying silicone fluid is desired. Partial list of applications follows: tire industry, mechanical rubber goods, flooring, surface finishing, metal working, plastics, and glass manufacture.

Features: Silicone mold release emulsion gives fine surface detail, good surface finish, and economy in emulsion-system operation. It is believed to be the first stable emulsion for rubber and plastic mold release.

Description: Properties of SM-62 silicone mold release emulsion follow:

Weight per gallon	8.2-8.3 lb
Percent solids	36-38
Color	white
Fluidity	comparable to water

Product shows virtually no creaming or separation after 30 days at 2% silicone solids in hard water at room temperatures. Emulsion is compatible with most other mold release agents and additives. Material contains a rust inhibitor and will have little or no tendency to cause rust in the shipping container.

(SM-62 silicone mold release emulsion is product of Silicone Products Department, General Electric Co., Dept. CP, Waterford, N. Y. . . . or for more information check 6905 on form opp. last page.)

Non-staining rubber antioxidant has low volatility, good stability . . .

tests show product to give good protection to natural rubber

Announcement is made of a non-staining, non-discoloring antioxidant with low volatility and good stability. In recent tests material was found to give equal non-staining results and better protection to rubber than a commonly used non-staining antioxidant. Physical properties of product follow:

Physical state	liquid
Color, Gardner	9 max
Specific gravity, 30°C	1.08 to 1.09
Flash point, COC, °F	275 min
Viscosity, SSU, 210°F	50 to 60

(Nevastain A rubber antioxidant is product of Neville Chemical Co., Dept. CP, Pittsburgh 25, Pa. . . . or for more information check 6906 on form opposite last page.)

ADVERTISEMENT—*This entire page is a paid advertisement* *Prepared by U. S. Industrial Chemicals Co.*

U.S.I. CHEMICAL NEWS

July-Aug. ★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1956

U.S.I. TO PRODUCE ZIRCONIUM SPONGE; A.E.C. TO TAKE MILLION LBS. PER YEAR

Sodium Reduction Process to Be Used for Zirconium Manufacture—Yields Purer Product at Much Lower Cost

A 1,500,000 pound-per-year plant for the manufacture of reactor-grade zirconium sponge is being constructed by U.S.I. at Ashtabula, Ohio, site of the company's sodium and chlorine production facilities. Both of these raw materials will be used in the process when the installation goes onstream in mid-1957.

One million pounds per year for a five year period have already been committed to the Atomic Energy Commission according to a contract signed in May, 1956. This was the largest single contract awarded by the A.E.C. in its zirconium procurement program.

Essential in Atom Program

Reactor-grade zirconium is essential as structural material for atomic reactors and for cladding uranium, because of its low nuclear cross-section. This ability to let neutrons pass through increases the fuel efficiency of the reactor. Zirconium also has extremely high corrosion and heat resistance vital in atomic energy applications. Hafnium, always found in association with zirconium in the natural state, must be removed in an extra refining step in the manufacture of reactor-grade material, because of its neutron-trapping qualities, although the hafnium does not interfere with zirconium's corrosion resistance.

Important to Chemical Industry

The commercial grade, with 1-3% hafnium content, is expected to be used extensively by the chemical process industries. It has excellent resistance to acids, alkalis, corrosion and heat, combined with strength, ductility, light weight and good machining properties. It is hoped that U.S.I.'s new process can eventually bring the price of commercial grade zirconium sponge down to about $3.50 per pound, which is expected to result in finished fabricated zirconium parts priced at about $15 per pound. At this price it will be competitive with other high-quality materials of construction.

Zirconium has been used for many years to fabricate the spinnerettes employed in

MORE

Zirconium sponge made at U.S.I. pilot plant, flanked by 2 zirconium test rods.

U.S.I. Semi-Works Metals Plant at Ashtabula Is Under Construction

A half million pound-per-year semi-commercial metals plant is being built by U.S.I. at Ashtabula, adjacent to the site of the projected full-scale zirconium unit, and will be completed by September of this year. It will be used for production of zirconium sponge during construction of the larger installation.

Titanium, hafnium, thorium, beryllium and other metals can probably be made in this plant by the same basic U.S.I. process. The new plant will serve as proving ground for production of these metals when, and if, full-scale production is planned.

Recovery Process Developed

A U.S.I. process for recovering reactor-grade zirconium from hafnium-free scrap will undergo large-scale trial runs for the first time at the new unit. Already successful in the laboratory, this recovery process is expected to convert zirconium scrap into sponge on a toll arrangement for about half the cost of virgin sponge. This development is an important one, since only 30% of all zirconium purchased for fabrication is converted into the final structures or parts. Losses during metallurgical and production steps account for the other 70%.

Minimum Standards Being Set for Plastic Pipe

The National Sanitation Foundation has recently announced the establishment of minimum standards for plastic pipe used to carry drinking water. With the cooperation of the Society of the Plastics Industry, an identification program has been set up whereby participating companies use an NSF seal on their pipes and fittings when they meet standards. Manufacturers of the plastic raw materials must also have an NSF OK, and U.S.I.'s PETROTHENE® polyethylene resins have already received this approval.

This move is a step toward standardization of plastic pipe for all purposes. Polytheylene pipe is being used more and more, particularly in the chemical process industries, in applications where the conditions require that the best grade of pipe must be used. Purchasers should be sure they are getting pipe made of 100% virgin material, which will withstand the conditions of use.

U.S.I. can supply on request the names of pipe producers who maintain high quality standards in the manufacture of polyethylene pipe.

Nitrofurans Used as Chemotherapeutic Agents

U.S.I. Diethyl Carbonate Used in Synthesis

Another group of compounds has joined the sulfa drugs and the antibiotics in the fight against infection. This is the nitrofuran group of products, derived from furfural which has had a nitro-group added in the number five position on the ring, and which has been further modified by chemical reaction.

These products have the rare property of remaining effective against bacteria and fungi where resistant strains have been built up against the sulfas and antibiotics. Thus the medical man has a reserve weapon to draw upon when and if other agents begin to lose their effectiveness.

Hundreds of nitrofuran derivatives have been synthesized since 1944, and of these, five have proven effective enough for development into commercially usable antimicrobials:

nitrofurazone for controlling infected wounds, burns, ulcers and other skin lesions; infections of the eye, ear, nose and other mucous membranes; bladder infections; and diseases of cattle and poultry.

nitrofurantoin for treating bacterial infections of the urinary tract.

nitrofurfuryl methyl ether for fungi, spores and bacteria which attack the body.

furazolidone for treating some types of vaginal infections, and diseases in poultry. The U.S.I. product diethyl carbonate is used in the synthesis of this material.

A fifth derivative is now almost ready for marketing.

The work of synthesizing and testing new derivatives continues, but investigators are no longer proceeding haphazardly. Years of experiment have shown researchers how various nitrofurans interfere with the multiplication of bacteria in the body, and how these nitrofurans are dispositioned by the body. This information permits the synthesis of derivatives specially designed for specific body infections. As a matter of fact, nitrofurantoin, specific against urinary tract infections, was created in this way.

Other members of this group show anesthetic properties. Some are antihistaminic, and some affect certain types of cancer cells. So far, all exhibit a minimum toxic effect.

July-Aug. ★ **U.S.I. CHEMICAL NEWS** ★ 1956

CONTINUED

Zirconium

viscose rayon manufacture because of its resistance to the alkaline xanthate solution on one side and sulfuric acid on the other. Some other applications include:

- "Getters" in radio tubes. A "getter" is a small piece of metal enclosed in a vacuum tube which combines with any gases remaining to take them out of circulation. Zirconium has high affinity for gases, extends the life and efficiency of tubes.
- Desulfurizing, deoxidizing and anti-aging agent for steel. This use is also based on the metal's affinity for gases.
- Alloy for magnesium and gold.
- Powder metallurgy.

Sodium Process Employed

The new plant will be the first to make zirconium sponge employing semi-continuous production techniques developed by U.S.I. research men in the company's own laboratories. These techniques involve the use of sodium as the reducing agent for zirconium tetrachloride, and yield a zirconium sponge of greater purity as a result.

Zirconium sources are abundant, and the metal has been known and used for many years in its impure form. But production of a pure, ductile metal has presented many technical difficulties. Only in recent years, first with magnesium and now with U.S.I.'s sodium reduction process, have the problems of refining the metal been licked.

New Process Lowers Costs

The method, which can probably also be applied to other metals such as titanium, thorium, beryllium and hafnium, has the advantage over conventional processes of a lower initial investment cost. It is expected to bring the market price of reactor-grade zirconium sponge from the new plant down to less than half of the current price of about $15.00 per pound and to have the same effect on the price of the commercial grade. U.S.I. feels that the lower price plus greater availability will increase applications for the metal substantially. Therefore, the forthcoming plant has been designed for easy and rapid expansion.

Hansa Yellow G Pigment Now in Flushed Form

Produced From Acetoacetanilide

A flushed Hansa Yellow G pigment in paste form is being offered to the protective coatings industry for the first time, for use in finishes where high brilliance, good lightfastness and resistance to alkalis are desired.

This organic azo pigment is produced by coupling *m*-nitro-*p*-toluidine and acetoacetanilide. It is transferred from the water to the oil phase through pigment flushing in a medium-short glycerol phthalate soya-modified alkyd resin, and reduced with mineral spirits.

Improved Method Found For Administering Urethan In Treatment of Leukemia

A new method of administering urethan (ethyl carbamate) has substantially reduced undesirable side effects which previously limited urethan's use in treating several types of leukemia.

Urethan administered rectally by means of suppositories was found to give the same therapeutic response as that obtained by oral and intravenous treatment. Such adverse aftereffects as anorexia, vomiting, nausea and diarrhea were eliminated in most cases.

Electromet Titanium Plant Now Operating At Ashtabula, Ohio

The largest titanium plant in the world, built by the Electromet Division of Union Carbide and Carbon Corporation at Ashtabula, Ohio, went on stream in April 1956.

Metallic sodium acts as the reducing agent for titanium tetrachloride in the process, and is supplied from the U.S.I. sodium plant nearby.

TECHNICAL DEVELOPMENTS

Chemical resistance of polyethylenes, both conventional and low-pressure, and polyvinyl chlorides to about 400 reagents is shown in chart now being offered by plastics processor. **No. 1160**

A new liquid rubber corrosion-resistant coating can be brushed or sprayed onto all types of surfaces. Said to adhere well, shows excellent toughness, flexibility and abrasion resistance. Claimed to be waterproof, to protect against oil, chemicals, fungi, sunlight. **No. 1161**

A pepper-like bite in foods, lozenges, toothpastes and mouth washes can be provided synthetically by beta-cinnamylidene acetoyl piperidide at 1% of the concentration required for natural pepper. May aid carbohydrate digestion. **No. 1162**

Nine new adhesives for modern plastic packages have been developed by one company, both for forming the packages themselves and for labeling. These liquids are custom-made to bond to particular plastics in particular applications. **No. 1163**

Manual on electrically-conductive coatings is available which covers their use in research, development and design in fields such an automation, aircraft, electronics and geology. **No. 1164**

A new pigment for plastics, rubber and printing inks is reputed to have excellent permanence and resistance to heat discoloration. It is a brilliant maroon, non-bleeding, easily dispersed organic pigment. **No. 1165**

Plastic fittings of advanced design for polyethylene pipe are claimed to eliminate leakage problems by featuring secondary serrations beneath the clamp compression area to assure "bite" with the pipe. A hex hub for wrench tightening prevents damage to fitting. **No. 1166**

A new hand cleaner has been designed to remove oil, dirt, tar, pitch, dye, ink, paint or just plain heavy grime rapidly and thoroughly, according to producer. Claimed to give no skin reactions, leaves hands soft. **No. 1167**

The first dermatological cream containing prednisolone, a highly potent anti-inflammatory steroid, is now on the market. Claimed to relieve itching and pain of many allergies and eczemas, shows no systemic absorption. **No. 1168**

New dust mask to protect workers against nontoxic dusts is said to be light, comfortable, easy to breathe through. Polyethylene frames give strength and flexibility. Latex filter protects against particles down to one micron. **No. 1169**

PRODUCTS OF U.S.I.

INORGANIC CHEMICALS:

Sodium, Metallic: cast solid in tank cars, steel drums, pails; bricks in barrels, pails.
Chlorine: liquid, in tank cars.
Caustic Soda: 50% liquid, in tank cars.
Sodium Peroxide: dust-free granules, in drums.
Sulfuric Acid: all strengths, 60° Baumé to 40% Oleum. Also Electrolytic grade to Federal specifications. Tank cars or tank wagons.
Ammonia: Anhydrous, commercial and refrigeration. Tank cars or tank wagons. Also Nitrogen Fertilizer Solutions.

OTHER PRODUCTS:

Alcohols: Ethyl (pure and all denatured formulas), Normal Butyl, Amyl, Fusel Oil; Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL® PR.

PETROTHENE® Polyethylene Resins.

Esters, Ethers and Ketones: Normal Butyl Acetate, Dibutyl Phthalate, Diethyl Carbonate, Diethyl Oxalate, Ethyl Acetate, Ethyl Ether, Acetone.

Intermediates and Fine Chemicals: Acetoacetarylides, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate solution, Urethan USP (Ethyl Carbamate).

Animal Feed Products: Calcium Pantothenate, Choline Chloride Products, Curbay B-G® 80, Special Liquid Curbay®, DL-Methionine, Niacin USP, Riboflavin Concentrates, Vitamin B_{12} and Antibiotic Feed Supplements, Vacatone® 40, Vitamin A, D_3 and K_3 products.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Riboflavin USP, Urethan USP, Intermediates.

U.S.I. INDUSTRIAL CHEMICALS CO.
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Malononitrile and derivative contain special stabilizer that extends shelf life . . .

commercial production of chemicals broadens usefulness in many fields

Uses: In addition to the obvious synthesis of pharmaceuticals for human and veterinary medicine, new uses are expected to develop in synthesis of dyes, photographic chemicals, insecticides, and other products.

Features: Short shelf life, one of the old bugaboos with former material, has been extended by incorporation of a special stabilizer.

Description: Malononitrile and its sister EMMA (ethoxymethylene malononitrile) are available in pilot plant quantities. In spite of its known tendency to polymerize, chemical can be hydrolyzed, hydrogenated, halogenated, and alkylated in normal reactions. Condensation with many aldehydes and ketones proceeds in a normal manner. Useful pyrimidines, pyrazoles, and quinolines can be prepared.

(Malononitrile and derivative are products of Kay-Fries Chemicals, Inc., Dept. CP, 180 Madison Ave., New York 16, N.Y. . . . or for more information check 6907 on form opposite last page.)

Facilitates making the thio analogues of many therapeutically important diethylaminoethanol derivatives . . .

inclusion of sulfur often gives increased activity and more favorable toxicity ratios

Uses: Should find use in pharmaceuticals.

Features: Compound facilitates preparation of the thio analogue of many therapeutically important diethylaminoethanol derivatives, such as local anesthetics, antispasmodics. It is also a starting material for phosphorous-containing pesticides and should promote polymerizations involving conjugated diols.

Description: 2-Diethylaminoethanethiol hydrochloride melts at 170°C (min) and has minimum purity of 96%. It is very soluble in water, fairly soluble in ethanol, and insoluble in benzene.

(2-Diethylaminoethanethiol hydrochloride is a product of Evans Chemetics, Inc., Dept. CP, 250 E. 43rd. St., New York 17, N.Y. . . . or for more information check 6908 on form opp. last page.)

For more information on product at left, specify 6909 . . . see information request blank opposite last page.

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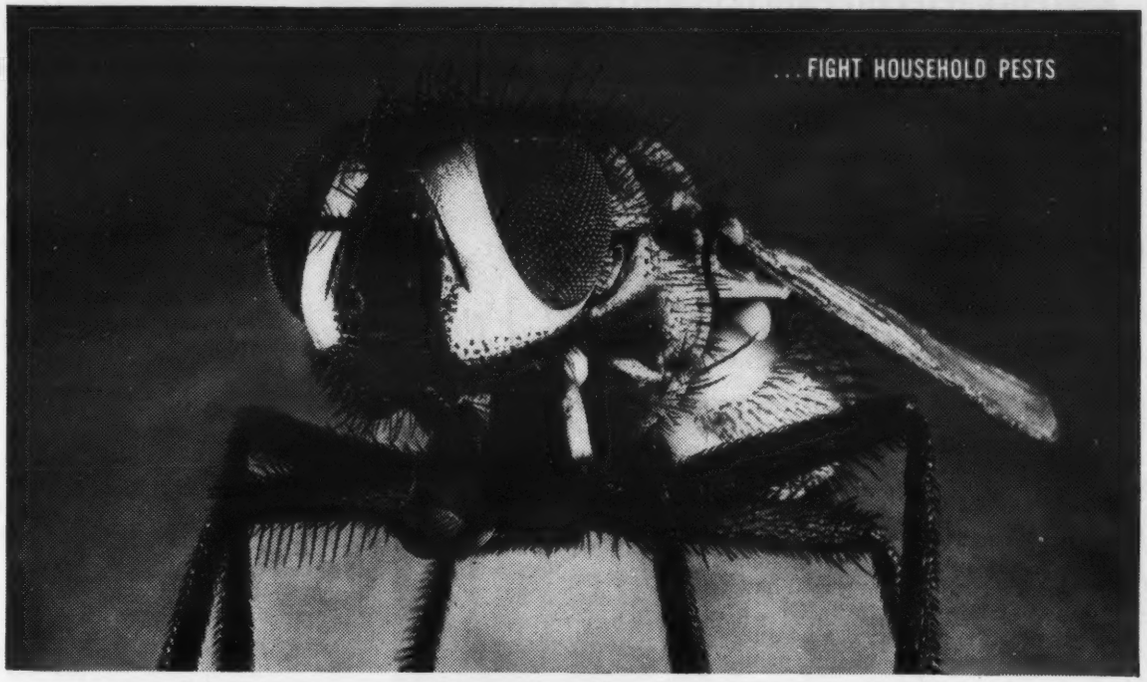

FRIGHTENING CLOSE-UP, this fly can be more than a nuisance. Household insects carry disease, menacing the health of whole communities. To help control flies, mosquitoes, and similar pests, many homeowners rely on insecticides based on Hercules Thanite®. Commercial firms, municipalities, and official insect control agencies have also found that when Thanite is added to their formulations it gives immediate knockdown, plus maximum high kill.

SALES BY THE BARREL—Rosco screw drivers practically sell themselves. Their colorful plastic handles, based on Hercules Hercocel® (cellulose acetate), are as durable as they are attractive. Soon to join the expanding line of Hercules plastics will be Hi-fax*, a revolutionary new ethylene polymer with properties unmatched by any material previously available. *Trademark

FOR LONGER-LASTING BEAUTY at low cost, swimming pool owners everywhere depend on protective coatings based on Parlon® (chlorinated rubber). Parlon paints, such as Inertol Ramuc pool enamel which was used on this pool, won't fade or peel despite weathering and submersion. Wherever protective coatings must meet a corrosive challenge from moisture or chemicals, Parlon-based paints provide an ideal all-purpose maintenance finish.

Q56-4

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SYNTHETIC RESINS, CELLULOSE PRODUCTS, CHEMICAL COTTON, TERPENE CHEMICALS, ROSIN AND ROSIN DERIVATIVES, CHLORINATED PRODUCTS, OXYCHEMICALS, EXPLOSIVES, AND OTHER CHEMICAL PROCESSING MATERIALS

HERCULES
CHEMICAL MATERIALS FOR INDUSTRY

When inquiring check 6910 opposite last page

having problems with your present low-molecular weight fatty acid?

then try

Emfac®

Pelargonic Acid!

Because of its odd-carbon length, pelargonic acid acts differently in many instances from low-molecular weight fatty acids occurring in nature. That's why pelargonic acid may give your end product just the exact property you have been striving to attain. Or...it may be the answer to a possible difficult problem of melting point, stability, or solubility. Whatever it be, send for an evaluation sample of unusual, Emfac 1202 Pelargonic Acid and see if it can give your product competitive advantages.

Here's where it fits in the commercial low molecular-weight series of fatty acids.

	Caprylic	Pelargonic	Capric	Lauric
Carbon Atoms	8	9	10	12
Molecular Weight	144	158	172	200
Titer, °C	12	10	30	42
Melting Point, °C	16	8	31	43
Boiling Point, °C at 760 mm.	238	255	270	299
Iodine Value	1	nil.	1	1
Acid Value	390	350	325	280

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Cincinnati 2, Ohio

Please send descriptive literature on Emfac 1202 Pelargonic Acid.

Name.....Title.....

Company.....

Address.....

City.....Zone....State.....

When inquiring check 6911 opposite last page

Quartet of vinyl stabilizers can be used in solo or duet to prevent deterioration . . .

counteract effect of hydrogen chloride release and subsequent oxidation

No. 633 is a non-staining, non-lubricating stabilizer for use with polyvinyl chloride and PVC/PVAc resins in floor tile compositions containing asbestos. A calcium-zinc salt, it produces good color and heat stability over long milling periods, and also gives a tackiness that causes sticking to calender rolls.

M-267A, also non-staining, is recommended for floor tile containing asbestos. It is a non-lead, modified calcium stabilizer and imparts a tackiness to the stock that aids in adhesion to the calender roll.

M-635 is used for vinyl floor tile compositions that contain no asbestos. A non-lead, non-staining, low-priced stabilizer, compound imparts a lubricity to the stock that aids in processing. In colored stocks, it supports color retention over long milling periods.

M-262B is an epoxy organic salt complex that is very similar to M-635 but is designed for situations where less lubrication is required. Stabilizer aids in retaining uniform color in processing highly filled floor tile stocks.

Stabilizers can be used alone or in combination. Physical properties of the quartet, which all come in white powder form, are:

	633	M-267A	M-635	M-262B
Sp gr	1.63	1.25	1.15	1.18
Free fatty acid (%)	—	—	<1.0	<1.0
Moisture (%)	0.5	<1.0	<1.0	<1.0
Ash (%)	20.0	8.0	25.0	15.0
Recommended amount (PPHR)	1-2	1-2	1	1-2

(Vinyl stabilizers for floor tile are products of Metasap Chemical Co., Inc., subsidiary of Nopco Chemical Co., Dept. CP, Harrison, N.J. . . . or for more information check 6912 opp. last page.)

Brochure for wax formulators lists uses, compatibilities

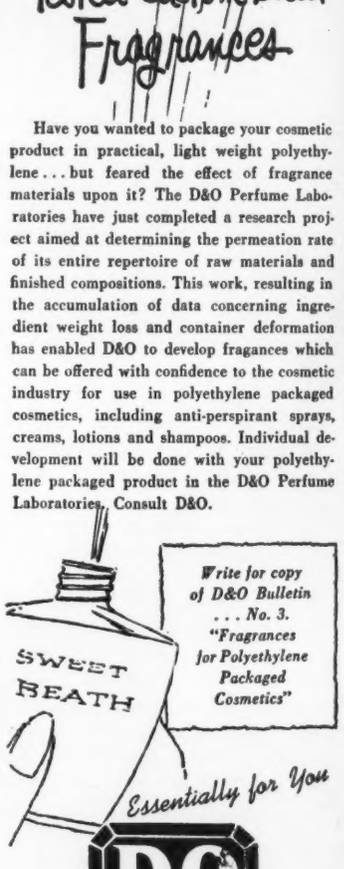
Possible applications, physical properties, and compatibilities of polyethylene waxes with other synthetic waxes, natural waxes, resins, and dyes are among useful information presented in 22-page, illustrated brochure. Formulation and formulation procedures are included to aid manufacturers of wax-containing industrial and consumer products.

"Epolene" brochure can be obtained from Eastman Chemical Products, Inc., Dept. CP, Kingsport, Tenn. When inquiring specify 6913 on form opposite last page.

For Your Polyethylene Packaged Cosmetics

Tested Custom-Built Fragrances

Have you wanted to package your cosmetic product in practical, light weight polyethylene . . . but feared the effect of fragrance materials upon it? The D&O Perfume Laboratories have just completed a research project aimed at determining the permeation rate of its entire repertoire of raw materials and finished compositions. This work, resulting in the accumulation of data concerning ingredient weight loss and container deformation has enabled D&O to develop fragances which can be offered with confidence to the cosmetic industry for use in polyethylene packaged cosmetics, including anti-perspirant sprays, creams, lotions and shampoos. Individual development will be done with your polyethylene packaged product in the D&O Perfume Laboratories. Consult D&O.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DRY SOLUBLE SEASONINGS

When inquiring check 6914 opposite last page

A material of many uses that can be obtained from shrimp shells . . .

deacetylated chitin is a cationic protective colloid with special properties

Uses: Compound imparts shrink resistance to wool. Besides the textile industry, it should find use in the paper, pharmaceutical, and food industries.

Features: In tests on woolen and worsted fabrics, compound reduces shrinkage on washing from 40 to less than 5% during a series of 12 laundering cycles, when deposited at about 3% solids on the wool. Small amounts added to beater size for paper improve water resistance and burst strength. When added to surface sizing formulations, compound improves paper finish, scuff resistance, gloss, moisture-proofness, and writing and printing properties.

A cationic protective colloid, compound is an emulsifying and stabilizing agent for emulsions containing acids and cationic material, such as are used in making water-repellent finishes, and in drug and cosmetic uses. In combination with oils and lubricants, compound forms a textile antistatic treatment.

Continuous fibers made from the material have high strength and good dyeing properties. Cast films have high strength, high transparency, and controllable water sensitivity.

Description: Called Kylan, product is a deacetylated chitin, a polymer of glucose amine that may be described as amino cellulose. Structural formula is very similar to cellulose.

Compound is isolated from chitin obtained from shrimp shells at plant in Brunswick, Georgia, of the Kylan Corp., Spartanburg, S.C.

(Kylan is distributed by Moretex Chemical Products, Inc., Dept. CP, PO Box 2528, Spartanburg, S.C. . . . or for more information check 6915 on form opposite last page.)

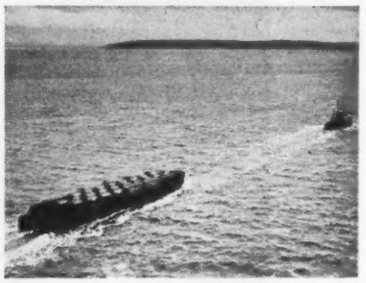
Depicts over 50 years of service to our chemical industry

The diversified chemical operations of this division are colorfully depicted in this 36-page brochure. Rubbers and rubber chemicals, polyester and polyvinyl chloride resins, agricultural and heavy chemicals are all described. Present status and history back to 1904 are given.

"Over 50 Years of Service Through Creative Chemistry" may be obtained on direct letterhead request to Naugatuck Chemical Division, United States Rubber Co., Dept. CP, Naugatuck, Conn.

BRIEFS for buyers of

Caustic Soda
Inert Lubricants
Caustic Potash
Carbonate of Potash



Caustic soda by barge might save you money

Nearby navigable water could make a big difference in the amount you pay for caustic soda and other heavy chemicals.

Some of our customers save up to tens of thousands of dollars a year because they receive more cheaply by barge.

The single barge shown here, for example, is on its way to a pulp mill with 11 tank cars of chemicals above deck, 1000 tons of liquid caustic soda below.

Your Hooker salesman can help you discover whether you can receive caustic and/or other Hooker chemicals more cheaply by barge from one of our plants or stock points.

Inert, high-density lubricants

Liquid oxygen and hydrogen peroxide —explosive fuels for rockets and guided missiles—have no effect whatsoever on Fluorolube® oils and greases.

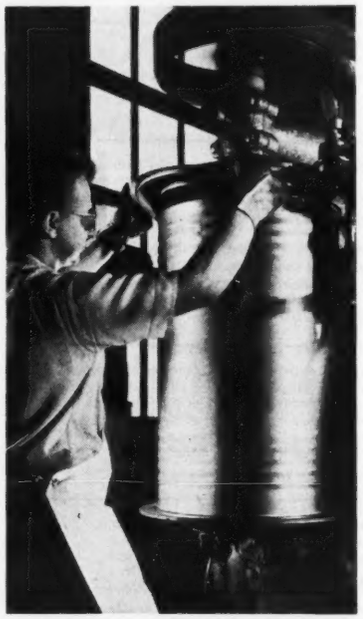
Fluorolubes are inert to most other reactive materials, including concentrated nitric acid.

Their densities are unusually high for organic compounds—from 1.8 gm/cc to 2.0 gm/cc. Yet, Fluorolubes wet metallic surfaces readily and thoroughly.

Thermally stable up to 300°C., these Hooker polymers of trifluorovinyl chloride won't burn at any temperature. They're non-toxic.

Because of these unique properties Fluorolubes show potential for many applications; as lubricants for ultra-precision instruments such as floated gyro units, for valve, pump, and bearing assemblies, for vacuum pumps; and as impregnants for gaskets and packing in highly corrosive service.

There are seven Fluorolubes, ranging from light oils to heavy greases. You can get technical data on all seven by checking the coupon.



Caustic potash — why the package is important

Expose it to air and solid caustic potash soaks up moisture and carbon dioxide swiftly.

Result: weaker, chemically damaged caustic potash that can slow down your processing.

To help you avoid such damage, and to protect the inherent purity of *Nialk*® caustic potash, we make our own shipping containers to our own rigid specifications.

Result: You always get Nialk caustic potash in the form and strength you want.

You can get *Nialk* caustic potash through all Hooker sales outlets, in these forms:

85% (low iron) and 90% solid, walnut, flake, granulated, broken, crushed and powdered. Flake is available in *low chloride* grade also.

45% to 52% liquid solutions in standard and *low chloride* grades.

If you'd like information on the physical properties of Nialk caustic potash, on shipping, etc., check coupon for technical data sheet and bulletin.

Carbonate of potash

Do you use both caustic potash and carbonate of potash? You might find that a single source for both offers faster, more economical supply. You can get both from Hooker.

For technical data on Hooker chemicals discussed on this page, check here:

- ☐ Caustic Soda, 50% & 73%
- ☐ Caustic Soda, solid and flake
- ☐ Caustic Potash
- ☐ Carbonate of Potash
- ☐ Fluorolubes, oils and greases

Keep your file up-to-date with technical data sheets on these other Hooker chemicals:

- ☐ Aluminum Chloride
- ☐ Lauryl Chloride
- ☐ Monochloroacetic Acid
- ☐ Muriatic Acid
- ☐ Sodium Benzoate
- ☐ Sodium Sulfhydrate
- ☐ Sodium Sulfide

Clip and mail to us with your name, title, company address. *When requesting samples, please use your business letterhead to help speed delivery.*

HOOKER CHEMICALS PLASTICS

6-1117

HOOKER ELECTROCHEMICAL COMPANY

508 Forty-seventh St., Niagara Falls, N. Y.

Niagara Falls • Tacoma • Montague, Mich. • New York • Chicago • Los Angeles

When inquiring check 6916 opposite last page

BECCO® Peroxygen Chemicals

Send for any of these
BECCO BULLETINS

HYDROGEN PEROXIDE AND ITS PROPERTIES

2 & 2A. Hydrogen Peroxide.
3. Highly Concentrated Hydrogen Peroxide.
23. Method of Measuring H_2O_2 Concentration in More Concentrated Solutions.
40. Equipment for Use with High-Strength H_2O_2.
41. Becco Hydrogen Peroxide 35% Formula F.
42. Becco Hydrogen Peroxide 35% Formula D.
46. Concentrated Hydrogen Peroxide.
50. History of the Hydrogen Peroxide Industry.
54. Self-Heating of H_2O_2 Storage Vessels.
55. Stability of Pure Hydrogen Peroxide.
59. The Analysis of H_2O_2 Solutions.
62. Hydrogen Peroxide Vapor.
67. Hydrogen Peroxide Physical Properties Data Book (Price $1.00 prepaid).
70. Becco Hydrogen Peroxide SP "100".

PERSULFATES

11. Potassium Persulfate.
34. Uses of Persulfates—A Bibliography, Part I.
49. Ammonium Persulfate.
68. Uses of Persulfates—A Bibliography, Part II.

SODIUM PERBORATE

45. Sodium Perborate.

PERACETIC ACID

4. Peracetic Acid 40%.
24. Analysis of Aliphatic Peracids.

PEROXYGEN COMPOUNDS

1. Active Oxygen Chemicals.
5. Acetyl Peroxide.
6. Sodium Carbonate Peroxide.
7. Alkaline Earth Metal Peroxides.
8. Sodium Pyrophosphate Peroxide.
10. Urea Peroxide.
28. A Safe Method of Isolation of Acetyl Peroxide.

TEXTILE BLEACHING

25. Analysis of Peracetic Acid Bleaching Solutions.
29. Hydrogen Peroxide Dry-In Process for Bleaching Wool.
35. Modification of Wool with Peroxygen Compounds.
38. Oxidation of Vat Dyes on Cotton and Synthetics with Hydrogen Peroxide.
43. Treatment of Cellulose and Cellulose Derivatives with Peroxygen Compounds.
52. Bleaching with Some Peroxygen Chemicals.
53. Fluorescent Agents in Hydrogen Peroxide Bleaching of Knit Goods.
60. Successful Bleaching of Type 670 Nylon.
61. Knit-Goods Bleaching Range.
71. Continuous Bleaching of Cottons with Silicate-Free Peroxide Solutions.

PULP BLEACHING

31. Groundwood Bleaching Variables — A Statistical Approach.
32. Hydrogen Peroxide Bleaching of Chemical and Mechanical Pulps.
47. Peroxide Bleaching of Pulps.
48. High-Density Pulp Bleaching Processes.
64. Development Studies on Last-Stage Peroxide Bleaching of Alkaline Pulps.
65. Peroxide Bleaching of Southern Pulps.
66. Becco Laboratory Procedures for Pulp Bleaching, 1955 Edition.

MISCELLANEOUS

15. Peracetic Acid 40%, A New Germicide-Fungicide for the Food Industry.
15A. Application of Peracetic Acid Germicidal Washes to Mold Control of Tomatoes.
17. Oxidation Reactions with Aliphatic Peracids.
26. Purification of Metal Salt Solutions with Hydrogen Peroxide.
27. Modification of Starches, Proteins and Gums with Peroxygen Chemicals.
33. Seed Treatments with Peroxygen Chemicals.
36. Progress in Peroxides.
39. Surface Treatment of Metals with Peroxygen Compounds, Part I.
51. Surface Treatment of Metals with Peroxygen Compounds, Part II.
56. Epoxy Fatty Acid Ester Plasticizers.
58. Epoxidation-Hydroxylation Reactions.
63. Action of Silver-Catalyzed Persulfate on 1,2-Glycols.
69. Epoxidation-Hydroxylation Reactions.
72. Octylene Oxide, New Olefin Epoxide.
73. Dodecane Oxide, New Olefin Epoxide.
74. C_{16}-C_{18} Olefin Oxide.

BECCO CHEMICAL DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
STATION B, BUFFALO 7, N. Y.
BUFFALO • BOSTON • CHARLOTTE • CHICAGO
NEW YORK • PHILADELPHIA • VANCOUVER, WASH.

When inquiring check 6917 opposite last page

ideas — from other industries and nuclear field . . . new trends in research, processes, services

High water costs holding up your plant expansion program? Dominion Foundries' whipped the problem by installing their own water treatment plant. System not only produces industrially clean water from turbid bay water, but also . . .

CUTS WATER COSTS BY 53%

Plant-treated water costs only 4c per 1000 Imperial gallons

Problem: Serious water purification problem confronted Dominion Foundries and Steel Limited (Dofasco) during their $50 million expansion program at Hamilton, Ontario. The giant project created need for larger quantities of industrially clean, odor-free, reasonably priced water for use in cooling rolling mills and for cleaning manufactured bar stock.

Daily requirement at completion of early phases of the expansion program was about 9 million Imperial gallons. Of this total, Dofasco was using 4.5 million gallons of city-treated water at a cost of 15c per 1000 gallons. This meant an annual bill from the City of Hamilton of approximately $250,000.

Balance of the requirement — 4.5 million gallons — was drawn through company's own pumps from the "rather murky and very turbid" water of nearby Hamilton Bay. Maximum turbidities ran over 200 ppm and averaged over 40 ppm. Furthermore, these high turbidities often lasted for periods of one to two weeks. Problem was further complicated by contamination

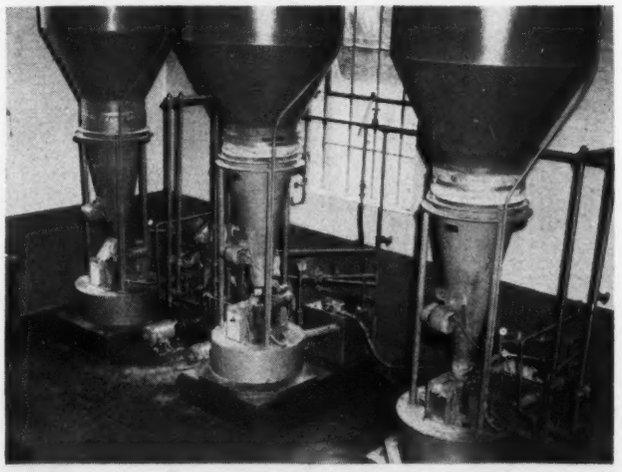
Operator points to glass indicator which shows improvement in water quality by treatment. Turbidity is reduced from 200 to 5 parts per million

with chemical wastes and sewage. The pH of the raw water often went down to an average of 5.0 when acid wastes from surrounding industry were dumped into the bay.

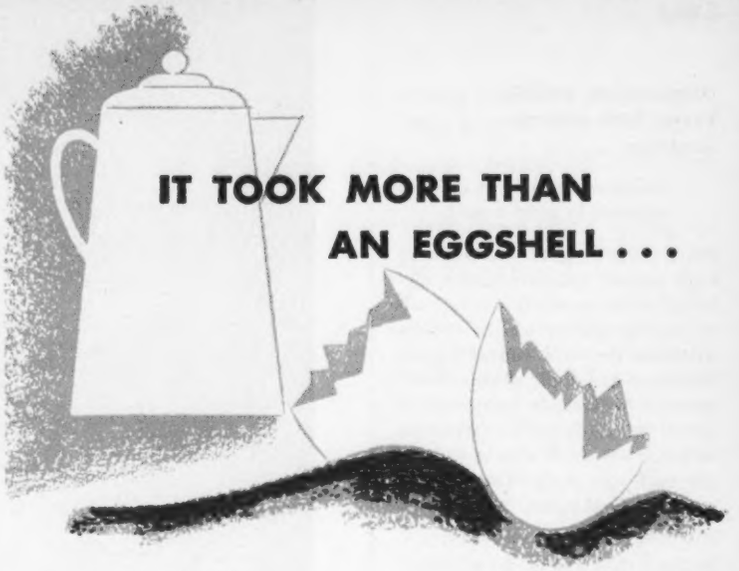
Water was screened to remove coarse solids, but mud, silt, and other finely divided material was not removed. Consequently, pipes and mains would clog from time to time and present costly maintenance and repair problems. Furthermore, odor from the bay water used in the plant processes was anything but pleasant.

Increased use of city water was out of the question. Not only would cost be prohibi-

(*Please turn to page* 58)



Chemical feeders feed necessary lime, alum, and clay into water supply



IT TOOK MORE THAN AN EGGSHELL . . .

to settle this coffee-making problem

Time was when smart housewives dropped an eggshell in the pot to keep coffee grounds collected at the bottom. But the advent of modern spray drying methods has produced the "instant" beverage and made the old coffee pot just a memory.

Ducon Cyclone TYPE SD

Today, efficiency engineered Ducon Cyclone Collectors help to assure success for the coffee processor's secret of solubility. This maintenance-free equipment is providing uninterrupted service with a high degree of recovery, plus quality control for all types of spray drying applications. Minimizing particle breakage, the unit not only collects valuable fines but returns them as part of the marketable product. Like all Ducon Collectors, it is a result of the kind of engineering which has made Ducon "the name" in dust control.

There is a Ducon unit for every dust collecting problem. Send today for descriptive literature.

the name in dust control

Canadian Branch: THE DUCON COMPANY of CANADA, Ltd.
275 James Street North, HAMILTON, ONTARIO

THE Ducon COMPANY

147 EAST SECOND STREET, MINEOLA, N.Y. • Sales Representatives in Principal Cities

Designers and Manufacturers of Dust Control Equipment Exclusively

CYCLONES • CENTRIFUGAL WASH COLLECTORS • TUBULAR CLOTH FILTERS • DUST VALVES

When inquiring check 6918 opposite last page

Glass resists 990°C, keeps high optical qualities . . .

designed for use as camera windows in wind tunnels

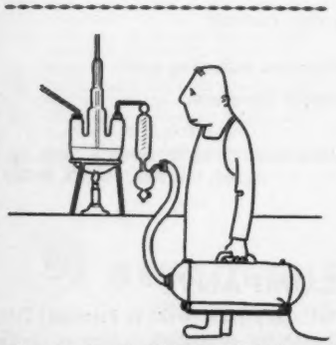
Fused silica glass maintaining high optical qualities under elevated temperatures is now a reality. Designed for use as camera windows in wind tunnel operations and ultrasonic missile work, material withstands temperatures up to 990°C. Index of refraction variation is only about 2×10^{-6} per inch per inch. Thermal expansion coefficient is 5.6×10^{-7} per degree C.

Product has high transmission in the ultraviolet range and does not darken under gamma radiation and electron bombardment. With high electrical resistivity and low dielectric loss (less than 0.0008 at 200°C and 1 megacycle), fused silica glass makes an excellent insulator for high voltages.

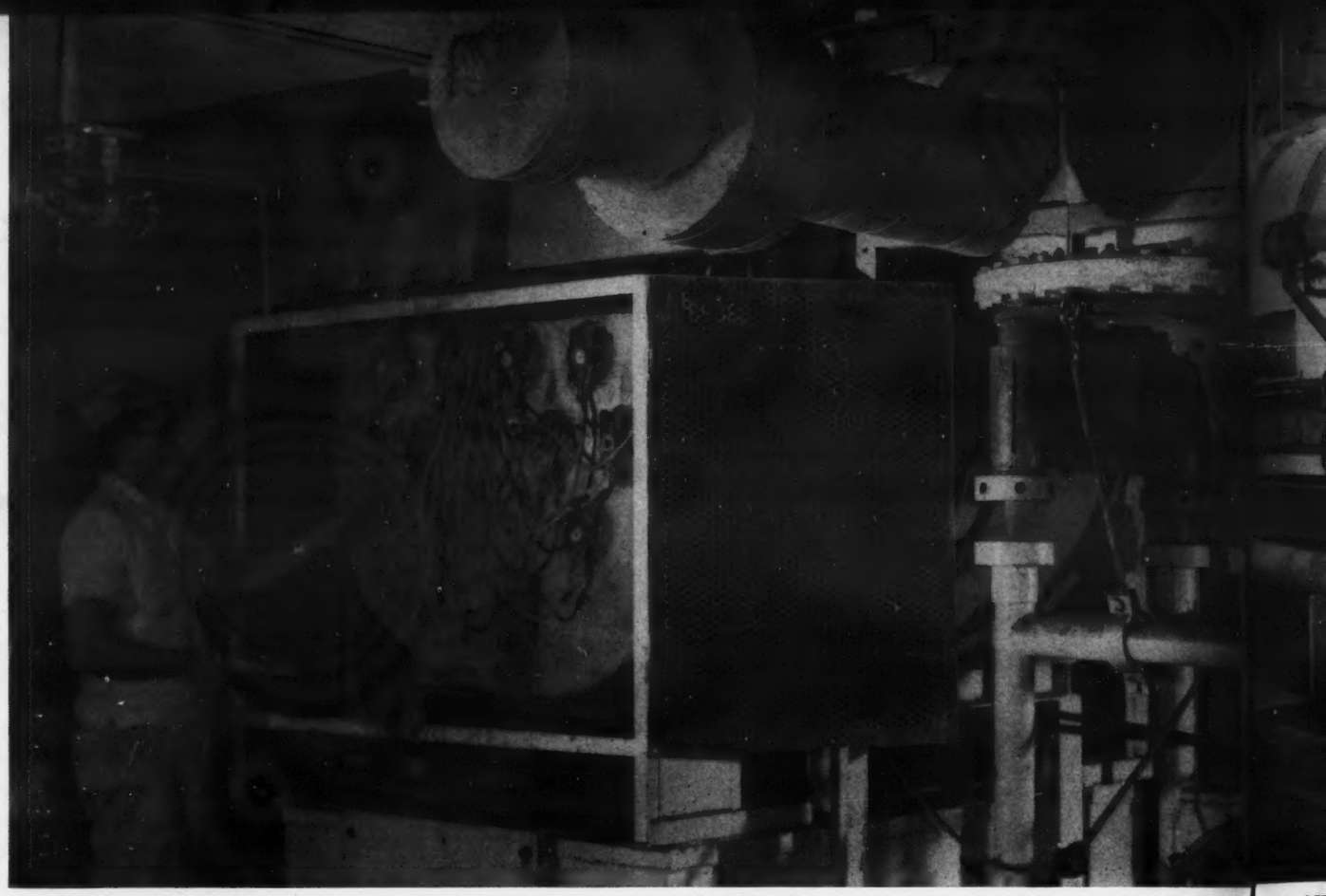
Low ultrasonic attenuation of the material (less than 0.03 decibels per foot per megacycle) also makes it a good medium for solid ultrasonic delay lines.

Windows are available up to 17 inches in diameter. Larger sizes can also be made.

(Fused silica glass is product of Corning Glass Works, Dept. CP, Corning, New York . . . or for more information check 6919 on form opposite last page.)



Idea by H. H. McGriff, Carbide and Carbon Chemicals Company, South Charleston, W. Va.



PRE-HEATED SULFUR is combined with pre-heated hydrogen in Stainless Steel catalyst chamber to form hydrogen sulfide gas.

HOW STAINLESS STEEL

SODIUM SULFHYDRATE comes through Stainless tubing into this Stainless filter press and is pumped into Stainless weigh tanks.

Brown Company to install MgO process . . .

will handle 750,000 lb waste liquor solids every 24 hr

Magnesium bisulfite pulping and chemical recovery process is being installed at the Berlin, New Hampshire, paper plant of The Brown Company. Reported to be the first MgO installation in the eastern part of US to recover both the chemical and heat values in waste sulfite liquor, plant will process 75,000 lb of waste liquor solids every 24 hours. Completion is scheduled for 1957.

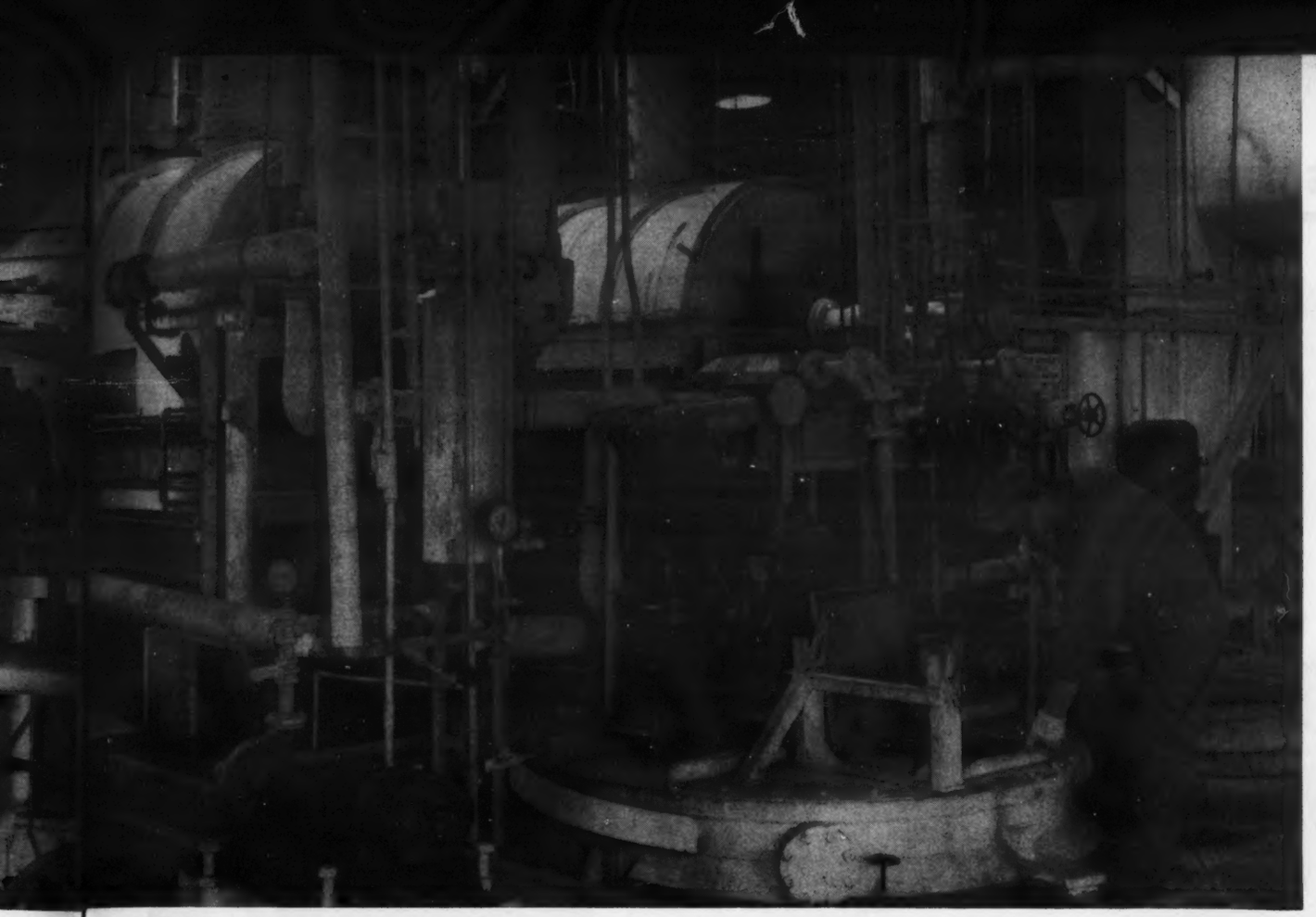
Weyerhaeuser Timber has first MgO installation now in operation at Longview, Washington.

(Licensing agent for the magnesium-oxide chemical recovery system is The Babcock & Wilcox Company, Dept. CP, 161 E. 42nd St., New York, New York . . . or for more information reader may simply check 6920 on the convenient Reader Service slip located opposite last page.)

Discusses use of plastics in foundry industry

Practical advice on the use of various plastics in foundry field is contained in six-page technical bulletin. Text uses simple language and step-by-step descriptions to outline working procedures developed by engineers in collaboration with pattern-makers and tool and die shops. Cross-sectional drawings illustrate making of core boxes by laminating and pouring methods.

Bul "Plastics in the Foundry Industry" is issued by the Marblette Corp., Dept. CP, 37-21 Thirtieth St., Long Island City 1, N.Y. When inquiring specify 6921 on form opposite last page.



AFTER FILTRATION, the solution is pumped to these flaker feed tanks, equipped with Stainless pumps, agitators and piping.

UPHOLDS PURITY

in sodium sulfide production

AT HOOKER ELECTROCHEMICAL COMPANY, NIAGARA FALLS, N.Y.

Hooker Electrochemical Company, Niagara Falls, N.Y., is a major factor in the marketing of sodium sulfide in the United States; and the firm goes to extraordinary lengths to protect its market by maintaining the highest standards of purity.

Almost automatically, this means the generous use of Stainless Steel where there is the slightest danger of contamination, resulting from corrosion. Stainless Steel serves in the sulfur boiler, pipelines, condensers, separators, filter presses, pumps, flakers and agitators.

Besides guarding purity, Stainless Steel often simplifies design. The agitators, for instance, could be made much *larger*, because the strength of Stainless permits it to operate at such a high stress level. Hooker had no trouble fabricating their Stainless equipment; in fact, it was practically all done locally.

To guard purity, resist corrosion, withstand high stresses and temperatures, nothing can equal Stainless Steel for chemical equipment. To be sure of service-tested quality, specify USS Stainless Steel.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL USS

SHEETS • STRIP • PLATES • BARS • BILLETS • PIPE • TUBES • WIRE • SPECIAL SECTIONS

UNITED STATES STEEL

For more information on product at left, specify 6922 . . . see information request blank opposite last page.

In JENKINS *Monel-seated Bronze Gates*

THE WEDGE* TAKES THE WEAR - *and spares the rings*

Easy replacement of the wedge only — right on the line — restores full efficiency

THE MONEL SEAT RINGS are expanded into the body to assure a positive, leak-proof joint. Exhaustive tests in typical monel-seated gate valve services show that this permanent all-around support of the rings is essential to guard against deforming, loosening, or shifting.

***THE RENEWABLE WEDGE** (bronze or nickel alloy) has excellent wear resistance, but has a lower degree of hardness than the heat-treated Monel rings, which have optimum resistance to erosion and corrosion as well as abrasion. Thus, wear of the wedge leaves the rings relatively unaffected. When necessary to renew the wedge, you simply remove the valve bonnet, slip the old wedge off the stem, and slip on a new one.

GET PRACTICAL, LOW-COST RENEWABILITY in the valves you choose for the tough, punishing services that require Monel-seated gates. Compare . . . there is nothing simpler, faster, or more economical than Jenkins replaceable wedge design — and you also get the *plus* of Jenkins *extra value* in every other feature. Jenkins Bros., 100 Park Ave., New York 17, New York.

***MADE WITH BRONZE OR NICKEL ALLOY WEDGE**

The bronze wedge provides lasting economy for most applications. The nickel alloy wedge provides extra resistance where rapid wear and corrosion are factors.

JENKINS BRONZE GATES WITH MONEL SEAT RINGS

200 psi	300 psi
Fig. 270-U, Bronze Wedge	Fig. 280-U, Bronze Wedge
Fig. 270-UN, Nickel Alloy Wedge	Fig. 280-UN, Nickel Alloy Wedge
Fig. 270-UL, Bronze Wedge, U.L. approved for L.P.G. Services	350 psi Fig. 280-UX, Bronze Wedge

JENKINS BRONZE GATES INCLUDE 40 DIFFERENT PATTERNS

125 • 150 • 200 • 300 • 350 psi SOLID WEDGE • SPLIT WEDGE
SCREWED • FLANGED • SOLDER END • SOCKET END QUICK OPENING

Call your local Jenkins Valve Distributor for complete information.

JENKINS VALVES
LOOK FOR THE JENKINS DIAMOND
SINCE 1864 TRADE JENKINS MARK
Jenkins Bros.

When inquiring check 6923 opposite last page

Water Treatment

(*Continued from page* 55)

tive, but existing facilities were already strained — especially in hot weather.

Solution: Company decided to install their own water purification plant to process water drawn from the bay. Two precipitators for 1) coagulation and settling or 2) coagulation and settling plus softening were constructed. Each unit measures 47 x 96 x 47′ deep and has capacity of 5200 gpm. Four chemical feeders, to treat the water with lime, alum, clay, and, when required, sulfuric acid, were also installed. Equipment can handle 15 million Imperial gallons (18 million US gallons) a day, if necessary.

Raw water is mixed by baffles before entering precipitators (right)

Feeders add the chemicals direct to the turbid supply. Water is then thoroughly mixed by baffles and fed at a controlled rate to the precipitators for coagulation and filtration. Height of sludge blanket in the units is automatically controlled by photoelectric cells operating from a beam of light shining through a continuous thin stream of water drawn from a pre-selected level in the upflow sludge filter compartment.

Results: In operation since March 1954, the purification plant is currently furnishing about 8 million Imperial gallons of water a day, at a cost of only 4c per 1000 gal. Use of city water, at a cost of 15c per 1000, has been reduced from 4.5 to 3 million gallons a day — thereby cutting the overall cost per gallon of treated water by about 53 percent — while the use of treated water has risen from 4.5 to 11 million gallons a day.

Water from the purification plant has an average turbidity of 5 ppm and pH of 7.5 — making it

entirely suitable for industrial use. The four chemical feeders distribute almost 3 tons of materials per day. Average dosages are: 1500 lb lime, 2700 lb clay, 1400 lb alum, and occasionally some sulfuric acid.

Total cost of water treating project was approximately $575,000. With operating costs averaging about $323 a day, (4c per 1000 gallons), it is expected that the installation will pay for itself in 4 to 5 years.

(Water purification equipment was installed by the Permutit Company of Canada Ltd., a subsidiary of The Permutit Company, Dept. CP, 330 West 42nd Street, New York 36, N.Y. . . . or for more information check 6924 on form opposite last page.)

AEC approves use of its facilities for private work . . .

will grant license to use inventions, discoveries made during course of project

Private organizations or individuals now may use AEC-owned facilities, under a recently-established policy. The Commission will permit use of its facilities and equipment provided user has appropriate security clearance, work will not interfere with AEC programs, and private facilities or equipment are not reasonably available.

Arrangements include: 1) assessment of charges based on either full recovery of costs of the work to the Commission or, where appropriate, on going commercial rates; 2) applicable patent provisions; 3) compliance with AEC regulations concerning health, safety and security; 4) appropriate indemnification of the Commission from claims arising out of the performance of private work.

As a minimum, the Commission will grant to the sponsor, an irrevocable, non-exclusive, royalty-free license to use inventions or discoveries made in the course of this work. Granting of license will be subject to security restrictions and requirements of the Commission.

(Information courtesy of US Atomic Energy Commission, Dept. CP, Washington 25, D.C.)

have you been selected? | **. . . to receive this magazine regularly?**

The Editors tell how key processing men are chosen to receive CHEMICAL PROCESSING every month.

See page 122.

202
302

now, Crucible low nickel stainless steels that meet many of your needs . . .

Here are two *new* Crucible grades, Rezistal type 201 and 202 that are similar in quality and properties to types 301 and 302 . . . but with desirable features all their own.

In the annealed condition, for example, Rezistal 201 and 202 have about 10% higher strength than 301 and 302, yet maintain almost identical ductility. This means that these grades can be fabricated with ease equal to their counterparts. In addition, their mill finishes and corrosion resistance to a wide variation of media compare most favorably with 301 and 302.

To sum up: Rezistal 201 and 202 have practically all the desirable properties of 301 and 302, *plus* some of their own. And they're available *promptly* in all forms. Write now for data sheets fully covering the properties of these new stainless grades. *Crucible Steel Company of America, Dept. ACP, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Canadian Distributer—Railway & Power Engineering Corp., Ltd.

When inquiring check 6925 opposite last page

Library of Congress to write bibliography on air pollution

Under an agreement reached with the Public Health Service, US Department of Health, Education, and Welfare, the Library of Congress is preparing a continuing, annotated bibliography on air pollution. Work will include references to physical, biological, engineering, legal-administrative, and economic aspects of atmospheric pollution. In addition to the bibliography, an annual compendium will be provided.

(Information courtesy of US Department of Health, Education, and Welfare, Division of Sanitary Engineering Services, Washington 25, D. C.)

Cut rice oil losses in refining process by additives . . .

adding 2.5% molasses reduces loss from 44% down to 23.3%

Recent laboratory tests indicate that losses of rice oil in the conventional alkali-refining process can be substantially reduced by use of certain organic additives. Compounds which have proved effective are blackstrap molasses, sucrose ethanolamines, and various glycols and alcohols.

Additives are added at the beginning, in either the batch or continuous refining process. Only a small proportion is needed. In the laboratory tests, rice oil refined without any additive showed a loss of 44%; addition of 1.8% monoethanolamine reduced refining loss to 17.4%. Blackstrap molasses, in proportion of 2.5%, cut losses to 23.3%.

Tests also showed that similar methods may be effective in cutting down losses of some off-grade crude cottonseed oils. In one case, addition of monoethanolamine brought loss down from 23.9% to 10.1%. Additives had an adverse effect on refining losses from normal crude cottonseed oil, however.

Steam Trap Standardization Slashes Trapping Costs

Major User Reports $25,000 Annual Maintenance Saving with 4000 Armstrong Traps

Here are the Benefits

- ***Quick Replacement of Traps*** **simply by uncoupling unions and installing a "spare" trap complete with nipples and half unions.**
- ***Bypasses Not Needed*** **—drain line can be shut off during quick trap replacement, even on critical equipment.**
- ***Repair Parts Inventory Reduced*** **by standardization on one make of trap.**
- ***Purchasing Simplified*** **through standardization.**
- ***Maintenance Men Become Experts*** **on one make of trap.**
- ***Armstrong Traps Last Longer*** **with less maintenance.**

MAJOR REDUCTIONS in steam trap installation and maintenance work and cost can be achieved by standardization on one make of trap which, in turn, permits standardized hookups. For example, a major chemical company reports an annual maintenance saving of $25,000 since installing 4000 Armstrong traps according to the drawing and photographs shown here.

Traps of a Size Interchangeable

Note particularly that exact dimensions are given for the pipe fittings, including nipples, connected to each size of trap. When a trap needs repair, the unions can be uncoupled, the trap lifted from the line, and a "spare" carrying indentical length nipples and half-unions slipped in place. Thus, in as little as one or two minutes, a faulty trap is replaced. It is then returned to the storeroom for repair and takes its place as a "spare."

Additionally, each trap hookup offers the following time and cost-saving advantages:

1. Test valve in trap cap to permit fast, easy checking of trap operation so that any failure can be quickly detected to avoid waste.
2. Strainer ahead of trap to protect it against dirt and scale.
3. Blowdown valve in strainer to provide easy cleaning.
4. Check valve in discharge line to isolate trap when test valve is opened.
5. Shut-off valves and unions ahead of and following trap to permit removal of entire trap from line.

No Bypasses

Because of the rapid spare trap interchangeability, there is no need for bypasses to keep a unit in operation in event of trap failure. The cost of bypass installations is avoided, as is the waste that occurs when bypasses are in use, or accidentally left open. (Experience indicates that bypasses are often left open *not* due to trap failure, but due to reducing valve failure which allows steam pressure to exceed maximum trap operating pressure.)

ORIFICE SIZES	
PRESSURE	SIZE
0-40	5/16
40-60	9/32
60-150	7/64

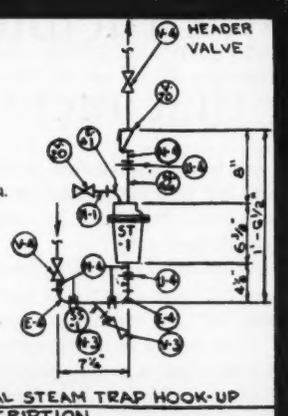
CAPACITY-0-300#/HR

NOTES:

DIMENSIONS SHOWN ARE FOR MINIMUM SPACE INSTALLATION.

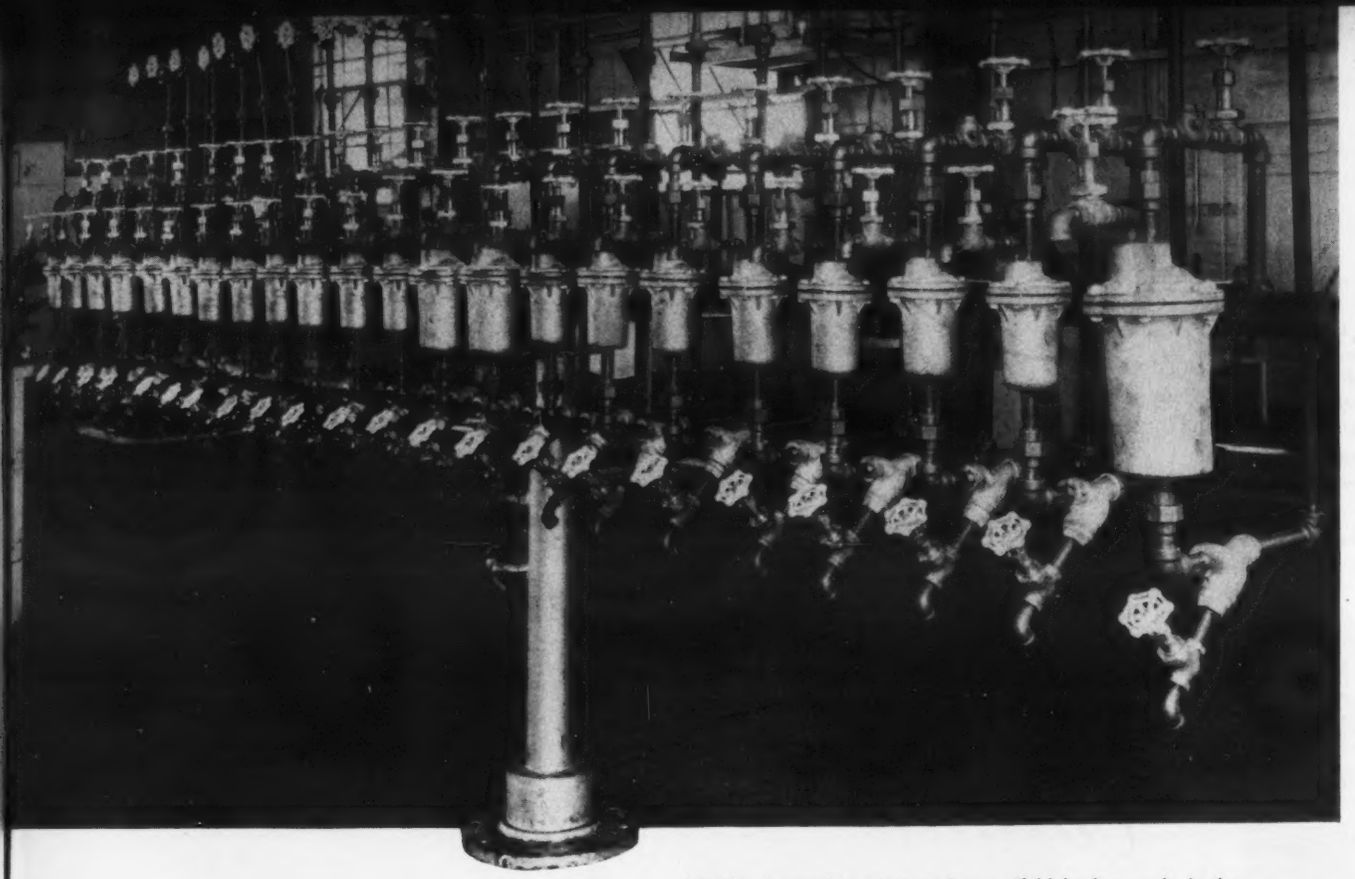
IN LONG RUNS - PIPE TO BE PITCHED TOWARD TRAP.

TRAP TO BE INSTALLED BELOW DRAIN POINT IF POSSIBLE IF NOT POSSIBLE, A CHECK VALVE MUST BE INSTALLED ON INLET SIDE OF TRAP.



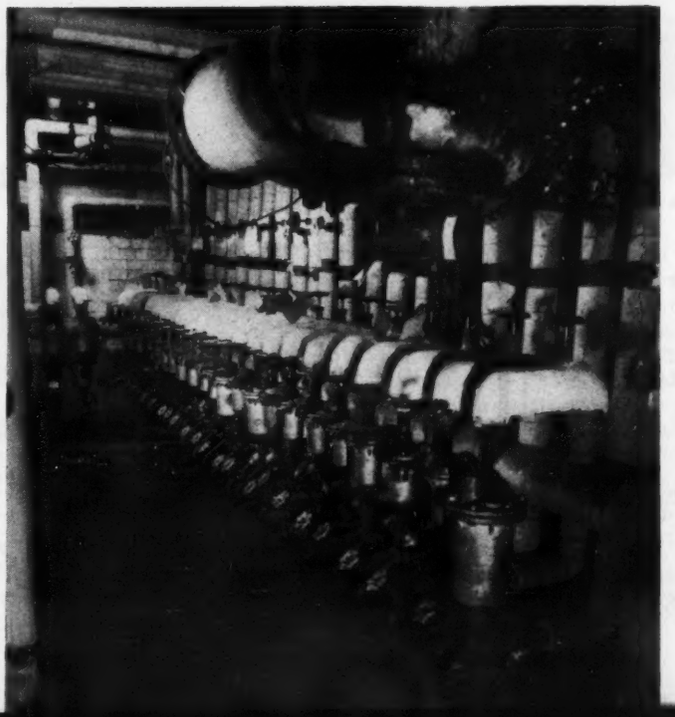
BILL OF MATERIAL FOR TYPICAL STEAM TRAP HOOK-UP

MARK	REQD	MAT'L	DESCRIPTION
ST-1	1	SEMI-STL CAST STL	½" STEAM TRAP - ARMSTRONG #211
SS-1	1	CAST STL	½" STRAINER - 250# W.S.P. -
V-4	2	BRZ	½" GATE VALVE - SCRD - 200# W.S.P. -
V-20	1	BRZ	½ GLOBE VALVE - SCRD - 200# W.S.P.
V-3	1	BRZ	½" GATE VALVE - SCRD - 200# W.S.P. -
V-70	1	BRZ	½" CHECK VALVE - SCRD - 200# W.S.P. -
E-4	2	MALL. FIRED STL.	½" - 90° SCRD ELL - 2000#
E-41	1	MALL. FIRED STL.	½" - 90° STREET ELL - 3000# -
U-4	2	MALL. FIRED STL.	½" UNION - 2000#
N-1	1	STL.	½" SHORT NIPPLE - SCH. 80 - SEAMLESS ASTM A-53
N-3	1	STL.	½" SHORT NIPPLE - SCH. 80 - SEAMLESS ASTM A-53
N-4	6	STL.	½" SHORT NIPPLE - SCH. 80 - SEAMLESS ASTM A-53
N-4/4	1	STL.	½" - 4" LG. NIPPLE - SCH. 80 - SEAMLESS ASTM A-53



ABOVE: A complete unit trapping manifold hookup made in the customer's piping shop. Note unions, shut-off valves, test valves and strainers for easy maintenance.

BELOW: Installation view of trapping hookup pictured above. All traps easily accessible for inspection and maintenance.



Condensate Headers

Another installation technique which saves installation and maintenance cost is the use, wherever possible, of trap manifolds. Traps and manifolds can be assembled in the plant pipe shop under ideal conditions for good workmanship and minimum time consumption. After assembly the manifolds are taken to the site of installation where lines from units in the vicinity are run to the traps. Traps are thus grouped where they can be found easily and where they are readily accessible for inspection and maintenance.

$25,000 Trap Maintenance Saving

Records kept on the Armstrong trap installation described here show that the cost of repair parts and complete replacement traps was approximately $10,000 less annually than with the traps previously used. Reduction in maintenance labor brings the total saving to $25,000 per year. *And fuel savings attributable to the traps are at least equal to the maintenance saving.*

FOR COMPLETE INFORMATION, ask for the No. 1, 1956 issue of the Armstrong Trap Magazine, together with a copy of the Armstrong Steam Trap Book containing complete data on Armstrong traps plus selection, installation and maintenance recommendations. Call your local Armstrong Representative or write:

ARMSTRONG MACHINE WORKS
880 Maple Street • Three Rivers, Michigan

(Tests were conducted at Southern Regional Research Laboratory, US Department of Agriculture, 1100 Robt. E. Lee Blvd., New Orleans 19, La. . . . or check 6926 opposite last page.)

Use of computers told in film series

How management can improve its decisions with aid of electronic computers is described in four 35-mm color sound filmstrips. Series covers complete field of electronic data processing, including evolution, definition, machine function, methods and applications, effect on personnel policy and company planning, and future developments.

To obtain filmstrip series, "Data and Decision: Using Electronic Computers in Business," remit $95 ($110 for nonmembers) direct to Visual Education Department, American Management Assn., 1515 Broadway, Times Square, New York 36, N.Y. Specify 6927 on form opposite last page.

Tropical performances of fungicidal coatings

Abilities of six different fungicides to suppress fungus growth on varnish films is discussed in eight-page research report. Toxidants studied were pentachlorophenol, salicylanilide, phenylmercuric phthalate, uranyl nitrate, copper-8-quinolinate, *p*-toluene sulfonamide, and 15 binary mixtures.

To obtain report PB 111788, "Tropical Performances of Fungicidal Coatings," Part II, July 1955, remit 50c direct to Office of Tech. Services, US Dept. of Comm., Washington 25, D.C.

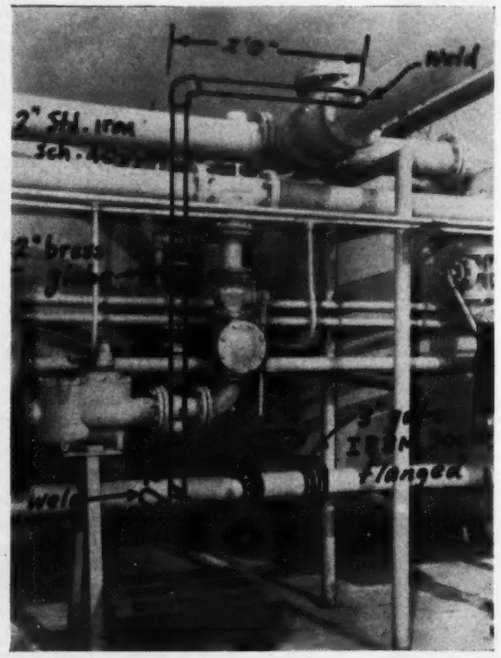
For more information on product at left, specify 6928 . . . see information request blank opposite last page.

Photographs replace blueprints at Davison Chemical Company to save time and money . . .

proposed construction, additions, or repairs are indicated on face of print

An excellent, inexpensive substitute for formal blueprints, that does not require free-hand sketching in the field and avoids pitfalls of verbal instructions, has been developed by Davison Chemical Co., Div. of W. R. Grace & Co. System is labeled "Photo-engineering" by its developer, Mr. J. H. Boyden, Jr., Assistant Plant Superintendent of Company's Lake Charles plant.

First, a photograph is taken, from several angles if necessary, of area to be developed by proposed



Most specifications for piping changes can be made right on face of photograph

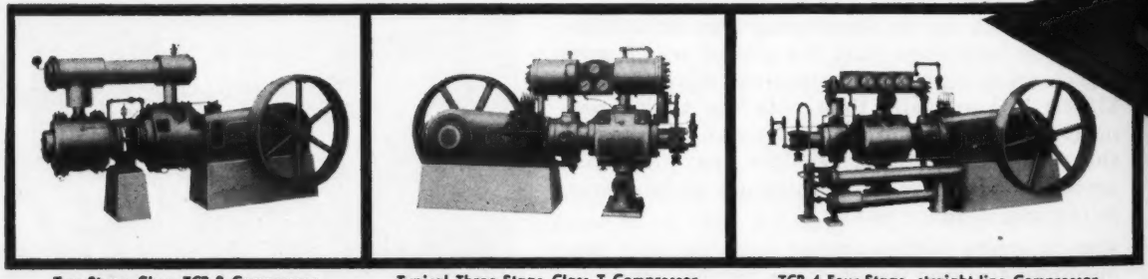
construction, addition, or repair work. Secondly, work to be done is indicated on photo in heavy India-ink lines, along with exact specifications. Most specs can be included on face of print but, if necessary, back can be used for additional instructions. If more than one drawing is needed, complete picture can be photographically copied as many times as required.

Photo-drawing pinpoints job to be done. A second photo is taken to confirm that work was carried out as planned. Negatives can be filed.

(Information courtesy of Davison Chemical Co., Div. of W. R. Grace & Co., Dept. CP, Baltimore 3, Md.)

Class T
compressors
for the plant whose process requirements range from
Vacuum - 7500 psia
up to 150 hp

The Class T Compressor is but one of a complete line of CP compressors for process work.
Other types available in sizes to 5,000 HP for pressures to 15,000 psig, with motor, steam or belt drive.

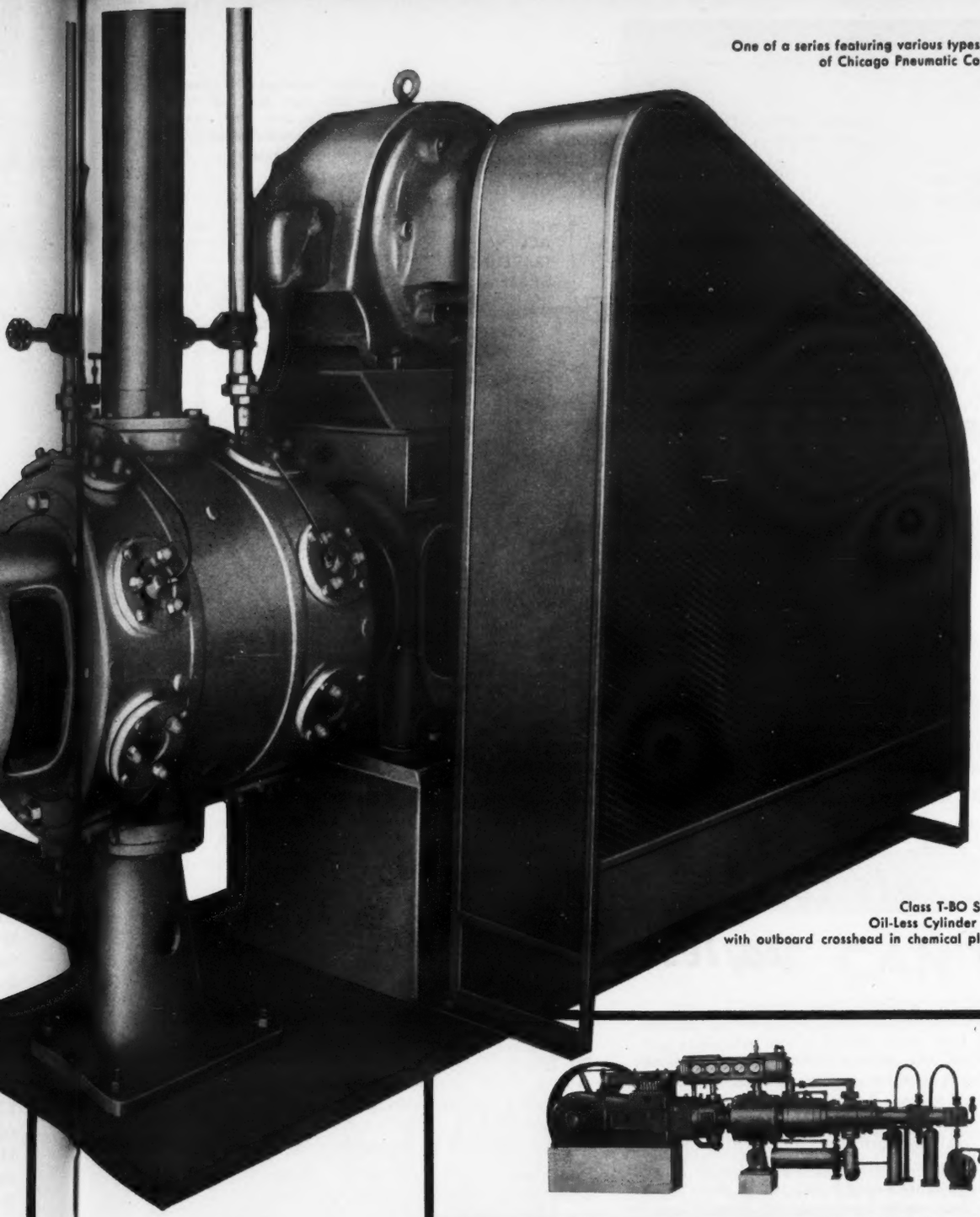


Two-Stage Class TCB-2 Compressor for pressures up to 500 lbs.

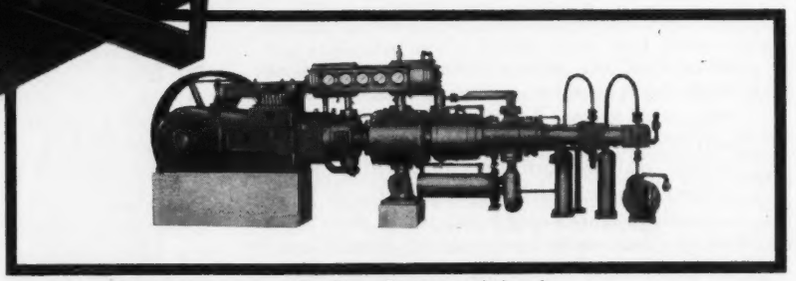
Typical Three-Stage Class T Compressor for pressures up to 2,500 lbs.

TCB-4 Four-Stage, straight-line Compressor suitable or 6000 lbs. discharge pressure.

One of a series featuring various types and sizes of Chicago Pneumatic Compressors.



Class T-BO Single-Stage Oil-Less Cylinder Compressor with outboard crosshead in chemical plant service.



Five-Stage Compressor designed for 7500 lbs. service.

Chicago Pneumatic 8 East 44th Street, New York 17, N. Y.

AIR AND GAS COMPRESSORS • VACUUM PUMPS • PNEUMATIC TOOLS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS

When inquiring check 6929 opposite last page

Announce sub-licensing policy for Chem-Dry process

In accordance with its new licensing policy, The Meyercord Company is offering sub-licensing rights to companies who pioneer the use of their Chem-Dry process in certain printing and coating industries. In return for its development investment, the licensee would have control of the process in his industry, with rights to use it in his own business and license others under the basic process patents.

In the Chem-Dry process, an almost instantaneous hardening of printed and coated films is obtained by a chemical reaction between the vehicle of the coating and sulfur dichloride vapor. Method can be used in a number of fields. For some applications, however, specific problems must be worked out to obtain full advantages. Solutions to these problems could apply to other uses of the process in the same industry.

(Licensing arrangements can be made through H. L. Barnebey, Dept. CP, 835 Cassady Avenue, Columbus 19, Ohio . . . or for more information check 6930 on form opposite last page.)

Soviet atomic journal available in US

Published by the Academy of Sciences of the USSR, the Soviet journal, "Atomic Energy", is going to be translated by a US firm. English translation is scheduled to appear on a bi-monthly basis and will carry articles and reviews of latest achievements in peaceful uses of atomic energy. Among topics covered will be: atomic physics, power generation, raw materials, application of radioisotopes, and safety measures. Annual subscription will be $85.

(Soviet journal will be translated by Associated Technical Services, Dept. CP, P.O. Box 271, East Orange, N. J. Check 6931 opposite last page.)

Bureau of Census report on H_2SO_4 industry

Advance report on the 1954 status of sulfuric acid industry is given in four-page bulletin. Included are statistics on total number of employes, quantity and value of sulfuric acid shipped, wages paid, and general breakdown by region and selected states. Report points out that in 1954 the industry shipped products rated at $139.3 million — an increase of 130% over 1947.

To obtain report MC-28-1.1, "Sulfuric Acid Industry", March 1956, remit 10c direct to Bureau of Census, U.S. Department of Commerce, Washington 25, D.C.

In which of
these 5 areas
is corrosion **costing**
you too much money?

1 **Vessels that wear out too soon?**

2 **Processes that contaminate your product, reduce yield or corrode equipment quickly?**

3 **Heat exchangers that cost too much for service rendered?**

4 **Pipelines and valves that can't take hot or cold corrosives long?**

5 **Fumes which attack and destroy ducts or stacks fast?**

If you have problems in these or related areas, Pfaudler's 72 years in the field of corrosioneering can help you minimize them.

Pfaudler engineers and fabricates corrosion resistant equipment built of glassed steel (resistant to both acids and alkalies), stainless steel, Hastelloy, titanium, nickel, copper, aluminum, etc. Our applications engineers recommend combination of materials that give you the best return on your investment.

And our project engineers can help you develop *processes* that will give you the end results you want with a minimum of corrosion.

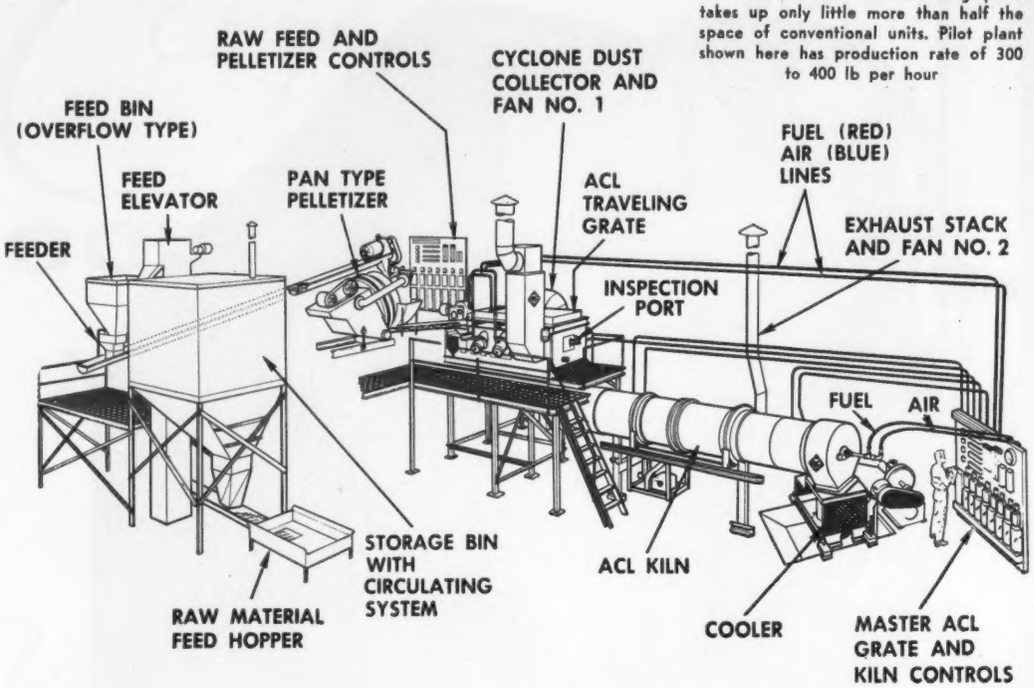
We suggest you send for our 1956 Buyer's Guide which explains in more detail how you can reduce corrosion costs.

THE PFAUDLER CO.
Rochester 3, New York
SPECIALISTS IN CORROSIONEERING

When inquiring check 6932 opposite last page

ideas — from other industries and nuclear field . . . new trends in research, processes, services

The ACL cement manufacturing plant takes up only little more than half the space of conventional units. Pilot plant shown here has production rate of 300 to 400 lb per hour



Although well known in other countries, ACL cement manufacturing process is only now beginning to catch on in U.S. Pilot plant set-up in Carrollville, Wis., tests untried raw materials, demonstrates how process reduces fuel costs and . . .

cuts cement plant dust losses to less than 1%

Pilot plant has been established at Carrollville, Wisconsin (15 miles south of Milwaukee), for the purpose of testing, demonstrating, and developing untried raw materials and new techniques in cement making with the ACL (Allis-Chalmers Lellep) traveling grate process. Although in considerable use in Europe and other parts of the world (there have been over 60 installations by Lellep licensees since 1950), the first US full-scale ACL system is only now being built in Milwaukee.

System represents an important milestone in the development of the cement industry. Process conserves raw material by cutting dust loss to less than one percent of weight of feed without additional dust-collecting system (dust losses with conventional kilns range between five to 10 percent per weight of feed). Equally important is saving in fuel, which amounts to over 40 percent as compared with present average in cement industry. Plant is compact — space requirements being reduced as much as 40 percent in some cases.

Pilot plant at Carrollville is the culmination of 27 years of development work and experience. It is the world's smallest ACL system — having a production rate of 300 to 400 lb per hour (about one bbl per hr). Commercial units vary in capacity from 60 to 175 bbl per hour.

Essentially the process consists of three parts — a pelletizing operation, a traveling grate for drying and partially burning the pellets, and a short kiln for final burning. Pellets are produced in a pan-type pelletizer preceding the grate. Dry finely

Comparative Savings of ACL System* vs Conventional Dry Process Kilns*

Fuel Used	Coal	Oil	Gas
Dust savings, $/bbl (ACL losses @ 0.55%/wt feed) (Dry process losses @ 3.9%/wt feed)	0.025	0.025	0.025
Fuel savings, $/bbl (ACL use @ 600,000 Btu/bbl) (Dry process use @ 900,000 Btu/bbl)	0.096	0.180	0.150
Power savings, $/bbl (ACL use @ 1.91 kw-hr/bbl) (Dry process use @ 3.90 kw-hr/bbl)	0.0199	0.0199	0.0199
Total savings, $			
Per bbl clinker	0.1409	0.2249	0.1949
Per 24-hour day	564.00	900.00	780.00
Per 300-day year	169,000	270,000	234,000
Basis:			
Capacity of plant, bbl/day			4000
Fuel costs			
Coal, $/ton at burner			8.00
Oil, $/gal (150,000 Btu per gal)			0.09
Gas, $/100,000 Btu			0.05
Power costs, $/kw-hr			0.01

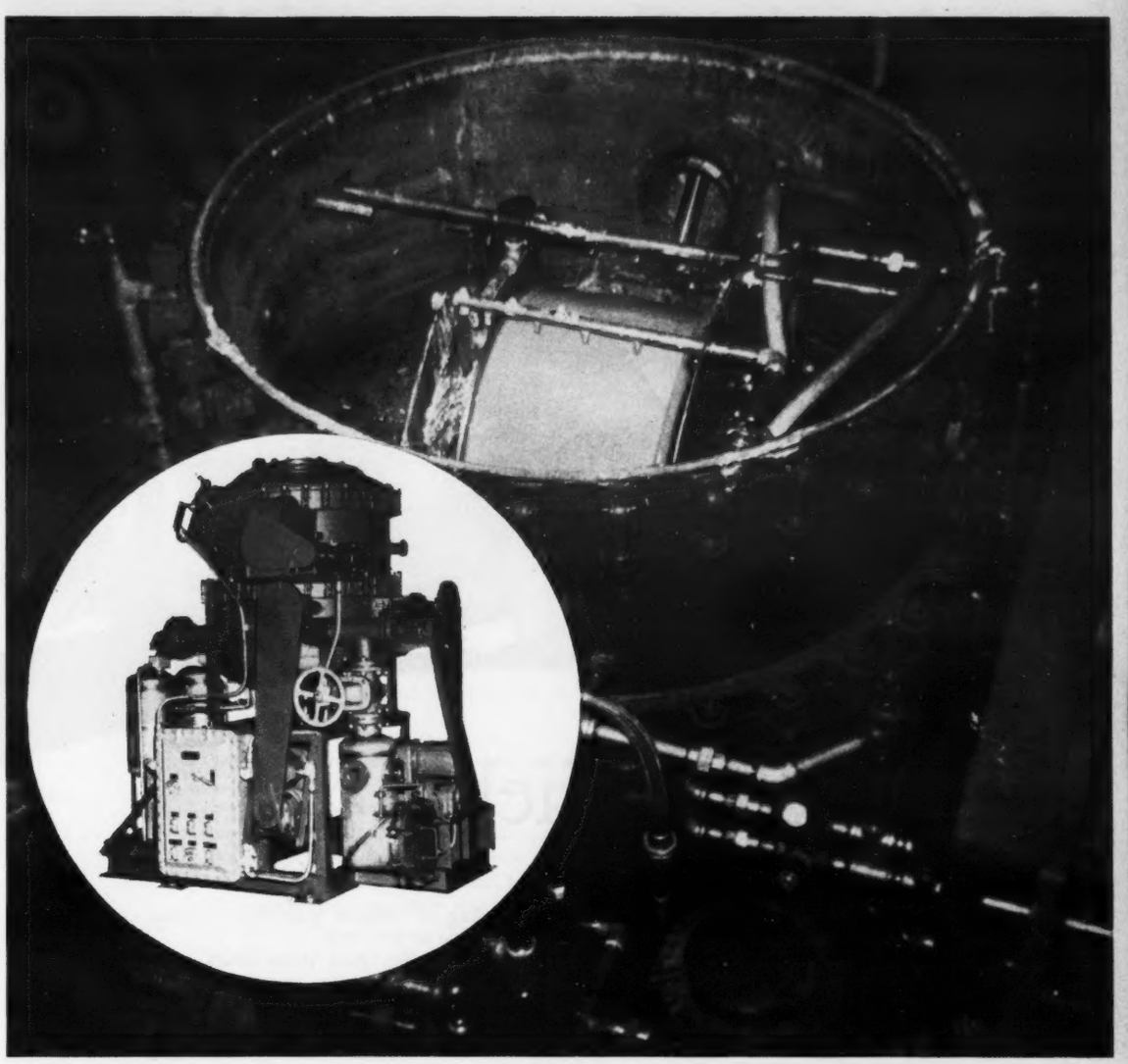
*Both without dust collectors following system

ground raw material is converted into 1/4 to 3/4" pellets by the addition of 12 to 14 percent water. Pelletizer has a slope of about 60 degrees and rotates at about 12 rpm.

A short conveyor delivers pellets to the grate feed hopper, from which they are fed onto the traveling grate in a layer about 6" deep. Pellets first enter the drying chamber where they are exposed to a downdraft flow of gases that enter at 500

(*Please turn to next page*)

Operator checks burning-zone temperature of pilot plant kiln



WE CAN'T SEND A SAMPLE

Eimco's Research and Development Center has the answer for the plants with difficult filtration problems. The engineers at the Center know that under certain product conditions it is unwise for the laboratory to try to reproduce plant conditions in which the sample was taken.

The alternate is to provide test equipment at job site suitable for wide range filtration problems. Eimco has designed several units similar to the unit shown above that can be used as standard drums, precoating drums, pressure drums and pressure precoating drums. These units are also equipped for washing and can use several types of cake removal attachments.

Eimco's experience in over half a century of service to process industries has given them the advantage of understanding filtration problems. The need for developing and producing numerous types of filtration equipment gives Eimco more opportunity to serve the customer's needs.

Eimco's objectives are: 1. To solve the customer's filtration problem successfully. 2. To recommend the most practical and economical equipment suited to the job, and, 3. To give a stand-by consulting service in securing maximum benefits from the equipment.

Yes! When you have a problem in filtration, Eimco can help whether or not you can send a sample.

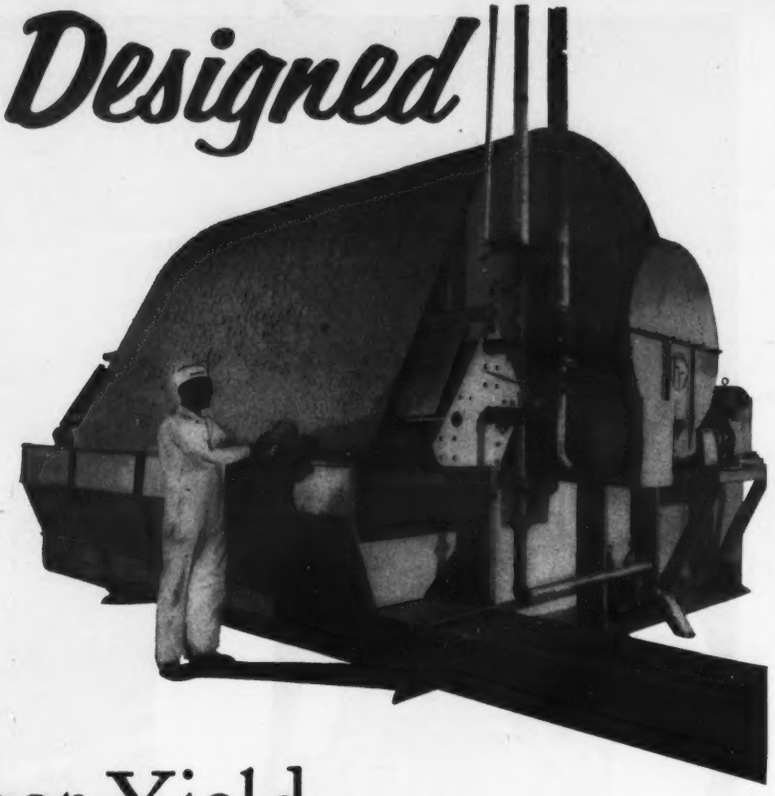
THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Baltimore, Md. Pittsburgh, Pa. Seattle, Wash. Pasadena, Calif. Houston, Texas Vancouver, B. C. London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa

When inquiring check 6933 opposite last page

Custom Designed



For a Bigger Yield

Higher yield in your case may mean cleaner, dryer cake . . . or better recovery of solubles . . . or just plain fast, trouble-free operation on a job that's got to be done. If you can get a few points better efficiency at no extra cost, why not?

FEinc custom-designed continuous vacuum filters have been doing just this for 37 years: For instance:

- **Replaced six settling tanks in recovering plastic grinding waste . . . paid for itself in 3 months**
- **Reduced moisture in iron pigment from 68 to 59%**
- **Cut recycling of difficult gelatinous sulphate cake from nine to five cycles**
- **Eliminated plugging, gave three hours more running time daily on sticky clay**
- **Reduced solubles in metallic stearate from 0.5 to 0.05%**
- **Recovered ⅔ of chromates left by competitive filter**

All types of continuous rotary vacuum filters . . . string, horizontal, scraper, precoat, etc. . . . are custom designed and manufactured by FEinc . . . quality built because quality pays you. Ask for bulletins . . . or for recommendations . . . no obligation, of course.

47

For a Bigger Yield **FEinc**

FILTRATION ENGINEERS, INC.
155 Oraton Street, Newark 4, N. J.

STRING

HORIZONTAL

SCRAPER

CUSTOM DESIGNED CONTINUOUS FILTRATION

When inquiring check 6934 opposite last page

Cement Pilot Plant

(*Continued from preceding page*)

Pellets are produced in a pan-type pelletizer rotating at about 12 rpm

to 600°F. The gases dry the pellets uniformly and are exhausted to atmosphere at 200 to 250°F.

Pellets then enter preburning chamber where they are exposed to downdraft of hot kiln exit gases at 1700 to 1800°F. Here the pellets are partially calcined (25 to 35 percent) and are heat-hardened before entering feed end of kiln. Final calcining and burning of cement clinker is accomplished in kiln. Because pellets remain uniform throughout process, "flushing" in kiln is minimized and more uniform burning conditions result. Hot clinker discharging from kiln (still in pellet form) is then cooled to recover heat and to facilitate further processing. Resultant clinker is then ground and packed in same manner as in any conventional cement plant.

A full-scale ACL kiln will range from 120 to 175 ft long, with 10½ to 13 ft inside diameter. The grate will add a maximum of about 85 ft to the length. This is still well below conventional kilns, which range from 300 to 500 ft long, with 10 to 12 ft inside diameter.

Double passing of the gases through the pellet bed assures low dust loss without additional dust collectors. The ACL system, when followed by a rather modest electrostatic precipitator, is said to result in dust losses six to seven times better than the requirements of the Los Angeles air pollution code, which is the most stringent in US. In most cases, exit gases are discharged to atmosphere cleaner than surrounding air.

(ACL process pilot plant was built by Allis-Chalmers Manufacturing Company, Dept. CP, Milwaukee 1, Wis. . . . or for more information check 6935 on form opposite last page.)

Bottleneck Broken:

West Coast Refinery Steps Up Propane Condenser Capacity

[redacted]—May 2, 1956.—Refinery engineers here have succeeded in boosting the capacity of twin propane condensers. Their solution was a simple one—retube with Wolverine Trufin® Type S/T.

As a result, one condenser now carries a heat load equal to that of the two units which were formerly tubed with prime surface tube. In addition, engineers have noted higher production figures and substantially lower operating costs.

The original layout called for one plain tube condenser to maintain the entire throughput while a second identical unit was held in reserve. Retubing was scheduled for every eight or nine months. Then, in an effort to increase production, both units were hooked up in parallel. Production went up and the retubing interval was increased to from 14 to 16 months.

When even greater demands were made on existing units, it was decided to retube with Wolverine Trufin Type S/T. Now, one Trufin-tubed unit maintains the same heat duty as the two prime surface condensers. The second Trufin unit is used for standby duty only. After many months of operation there is no indication that retubing will be necessary for some time to come.

The overall performance gain per unit is 57.1%.

Wolverine Tube Describes Trufin

DETROIT, MICHIGAN—June 15, 1956.—The story of the [redacted] installation is not surprising, Wolverine Tube engineers said today. There are many recorded case histories which show the unusual superiority of Wolverine Trufin Type S/T.

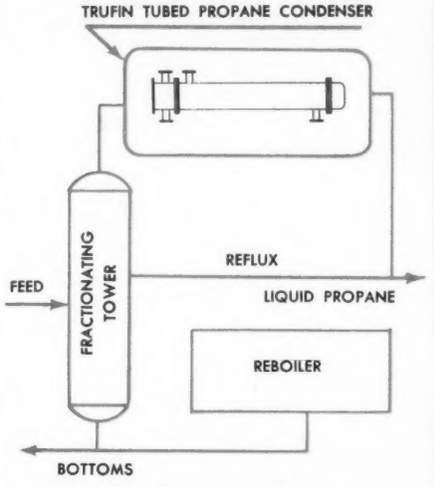
Many of these stories are found in a book "Opportunity" which Wolverine has made available to refinery and equipment engineers without charge.

Engineers describe Trufin as being an extended surface tube with fins extruded from the tube wall. The fins are an integral part of the tube; they cannot shake loose because of vibration, thermal shock or pressures.

A ¾-inch O. D. length of Trufin has an external to internal surface ratio of approximately 3½-1; it has about 2½ times the outside surface of the plain tube it is designed to replace.

Trufin is interchangeable with prime surface tube and standard tools and retubing techniques can be used. It fabricates as readily as prime surface tube with its fins providing additional support on bends. Trufin is available in copper, copper-base alloys, aluminum and electric-welded steel.

A Field Engineering Service is made available to refineries that need technical help in design, corrosion, fabrication or like problems.



Process flow chart showing propane condenser tubed with Wolverine Trufin Type S/T.

Actual comparison statistics of plain tube units and Trufin units.

Plain Tube Units		*Trufin Tubed Units*	
Shell diameter	36"	Shell diameter	36"
Number of tubes per unit	1596	Number of tubes per unit	1050
Total tube surface in sq. ft.	5000	Total tube surface in sq. ft.	9400
Type and size of tube ¾" x 16 ga. x 16 feet aluminum brass		Type and size of tube 1" x 16 ga. x 16 feet aluminum brass—Trufin Type S/T	

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CANADA VULCANIZER & EQUIPMENT CO., LTD.
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1469 CENTRAL AVE., DETROIT 9, MICH.
Manufacturers of Quality-Controlled Tubing and Extruded Aluminum Shapes

PLANTS IN DETROIT, MICHIGAN, AND DECATUR, ALABAMA. SALES OFFICES IN PRINCIPAL CITIES.

EXPORT DEPARTMENT, 13 EAST 40TH STREET, NEW YORK 16, NEW YORK

8 BIG ways TRUFIN®

can save YOU money...

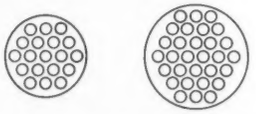
Anytime you can cut down costs, you pep up the profit picture. Here's an idea: where heat exchanger costs are concerned, Wolverine Trufin Type S/T—the integral finned condenser tube—can help you save money eight ways. Take a look at the advantages listed below. They can open the door to substantial savings and provide added dividends in increased efficiency.

1. Because Trufin is an extended surface tube—with fins extruded right from the tube wall—it has more than twice the heat transfer surface of plain tube of the same outside diameter. As a result, less tube is required because Trufin transfers more BTU's per foot of tube.

2. Fewer tubes mean smaller shells, headers, baffles, etc. This will save material requirements.

3. Fewer tubes mean fewer holes to drill—less rolling-in operations. Direct result: substantial savings in labor costs.

4. To transfer a given heat load—when Trufin is used—much less weight of over-all tube metal is required. You can realize a real savings when expensive alloys are necessary. This is of greatest importance when alloys are in short supply, as a given quantity of metal in Trufin transfers much greater heat loads.



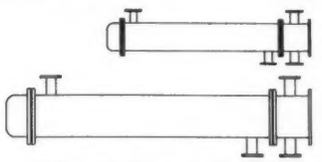
FEWER TUBES MEAN SMALLER SHELLS

5. Because of these material savings, lighter units, requiring less structural support—can be designed. This is vital when exchangers are to be mounted on superstructures.

6. Maintenance costs are low. Costs of replacement tubes are reduced; fewer tubes result in less cleaning time, more "on stream" time. Actual operating data proves that Trufin withstands fouling for longer periods than does prime surface tube. This increases the length of operating time between change-overs.

EQUIVALENT TUBES WITH THE SAME SURFACE

7. Smaller, lighter units result in easier handling and lower shipping costs.



TRUFIN MEANS SMALLER UNITS.

8. Where space is at a premium—as in revamped units—Trufin units are smaller.

There they are—eight job-proven ways in which Wolverine Trufin Type S/T condenser tube can save you money. Wolverine's Trufin Opportunity Book is filled with actual Trufin case histories, operating data, valuable design information. Write for your copy today.

Wolverine Trufin available in Canada through the Unifin Tube Company, London, Ontario

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1469 CENTRAL AVE., DETROIT 9, MICH.

Manufacturers of Quality Controlled Tubing and Extruded Aluminum Shapes

Pump handles 1600°F liquid metal at rate of 5000 gpm

For nuclear power plants, other applications requiring high-temperature heat transfer media

Hermetically-sealed mechanical liquid-metal pump has been developed that can handle fluid temperatures as high as 1600°F. Designed to circulate liquid sodium and sodium-potassium, it can be used in nuclear power plants, chemical process lines, and other applications requiring high-temperature heat-transfer media. Comparatively small in both size and

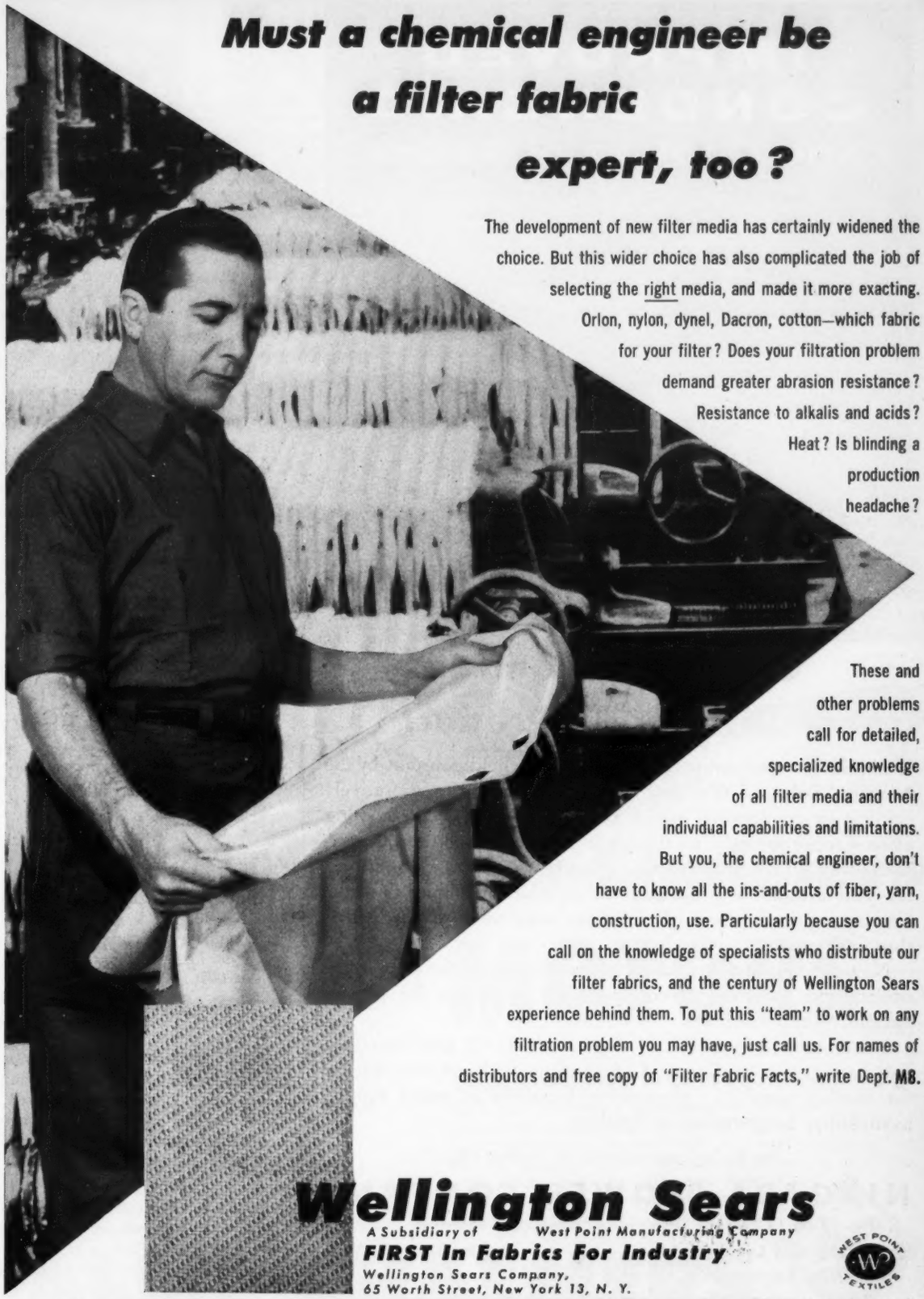
Hermetically-sealed mechanical liquid-metal pump has bearings made of sintered carbides to withstand corrosive effect of sodium

weight, pumps are available in capacities up to 5000 gpm.

Pump has no external shaft seals. Suction and discharge nozzles are designed to be welded into pipeline. Although pumped fluid is allowed to fill motor cavity, it is excluded from rotor and stator windings by sealing jackets in the magnetic gap. All surfaces in contact with pumped fluid are made of corrosion-

(*Please turn to next page*)

For more information on product at left, specify 6936 . . . see information request blank opposite last page.



Must a chemical engineer be a filter fabric expert, too?

The development of new filter media has certainly widened the choice. But this wider choice has also complicated the job of selecting the right media, and made it more exacting. Orlon, nylon, dynel, Dacron, cotton—which fabric for your filter? Does your filtration problem demand greater abrasion resistance? Resistance to alkalis and acids? Heat? Is blinding a production headache?

These and other problems call for detailed, specialized knowledge of all filter media and their individual capabilities and limitations. But you, the chemical engineer, don't have to know all the ins-and-outs of fiber, yarn, construction, use. Particularly because you can call on the knowledge of specialists who distribute our filter fabrics, and the century of Wellington Sears experience behind them. To put this "team" to work on any filtration problem you may have, just call us. For names of distributors and free copy of "Filter Fabric Facts," write Dept. M8.

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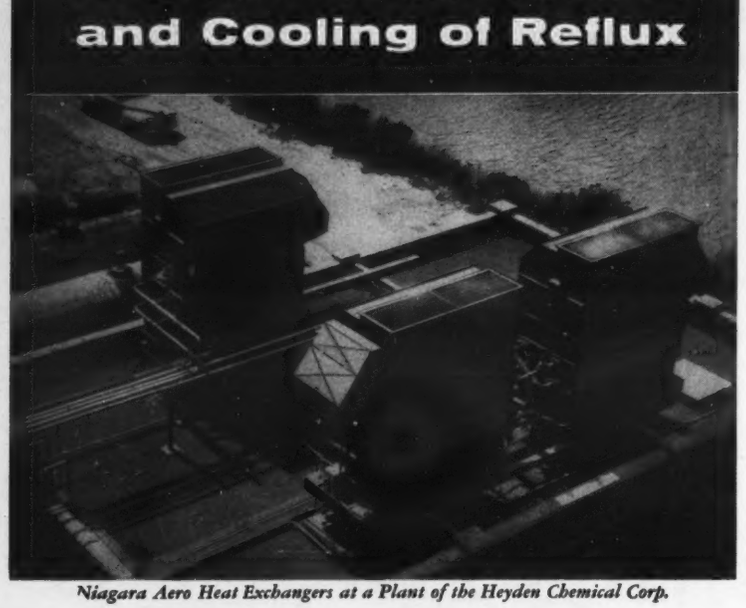
IMPROVED CONDENSING and Cooling of Reflux



Niagara Aero Heat Exchangers at a Plant of the Heyden Chemical Corp.

Get Better Control of Distillation Product

● Liquid or vapor temperatures are always held constant by the Niagara "Balanced Wet Bulb" control method of evaporatively cooling or condensing, which automatically varies the cooling effect proportionately to the load. The distillation product is therefore uniform throughout all changes in climatic conditions the year around; it is the same in the heat of summer as in the freezing cold of winter. Continuous maximum production is thus insured.

Non-condensibles are effectively separated at the condensate outlet, with notable sub-cooling after separation for greater vacuum pump efficiency.

NIAGARA AERO HEAT EXCHANGERS give sustained full capacity in cooling and condensing with no dependence on cooling water . . . eliminating problems of water supply, availability, temperature, or quality.

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District Engineers in Principal Cities of U. S. and Canada

When inquiring check 6938 opposite last page

(*Continued from preceding page*)

resistant alloys — austenitic stainless steel and Inconel.

An external supply of coolant is the only auxiliary requirement. Double walls are provided between coolant and the sodium at all points of the integral heat exchanger. The bearings, lubricated by the pumped fluid, are made of sintered carbides to withstand corrosive effect of sodium. Good lubrication is assured by keeping temperature of the sodium in region of bearings between 275° and 400°F regardless of temperature of the pumped fluid. The pumped fluid temperature has little effect on motor-winding temperatures, hence winding insulation considerations do not limit temperature of pumped fluid.

To provide for thermal expansion, a "thermal-flex" mounting system has been applied to the pump's radial bearings. Supported from mid-points of a series of leaf springs, bearings are self-aligning. Regenerative cold trap reduces to below 0.001 percent the sodium oxide particles that pass through motor and bearings. Trap also serves as heat exchanger for removal of motor's electrical-loss heat.

Conduction of heat from pump to motor end is reduced by an air-cavity thermal barrier. Stator windings are protected from heat in magnetic gap by double wire mesh thermal barrier between stator can and stator laminations.

(Hermetically-sealed liquid-metal pump was developed by Atomic Equipment Department, Westinghouse Electric Corporation, Dept. CP, PO Box 2099, Pittsburgh 30, Pa. . . . or for more information check 6939 on form opposite last page.)

Rectification efficiency of 95% given by germanium units rated 15,000 amp . . .

provide DC supply for electrolytic cells producing hydrogen and oxygen

Efficiency of two germanium rectifiers recently installed at General Electric Co.'s gas plant at Pittsfield, Mass. is 95%. Each unit is rated 15,000 amp at 65v and combination is one of the largest static, metallic rectifiers for industrial DC supply now in use. Output current is fed to two banks of cells for electrolytic dissociation of water to produce hydrogen and oxygen for G.E.'s transformer factory. Ultimate capacity of both banks is 14,000 cfh of hydrogen and 7000 cfh of oxygen.

Rectifiers are divided into three sections of 5000 amp each. Any two sections can be operated without the other. Each section consists of six trays containing ten pairs of germanium rectifier elements in parallel. Each pair is protected by a 300 amp fuse. Trays are connected in a three-phase, full-wave bridge circuit and require only two

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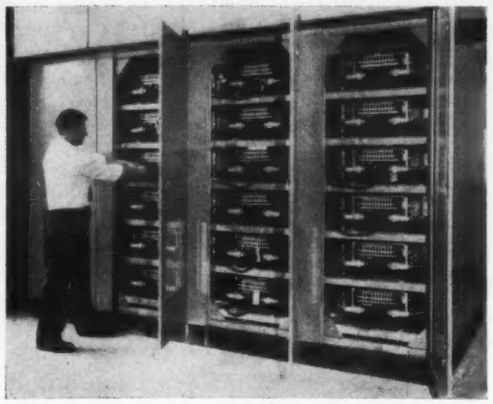
When inquiring check 6940 opposite last page

power connections per tray. Coolant is perchlorethylene pumped through trays in parallel to allow operation even with some trays removed. Perchlorethylene is cooled in a water-to-perchlorethylene heat exchanger. Connectors for coolant are snap-on type.

Three-phase, 13,800v power is fed from an oil circuit breaker through a 20% raise-lower induction voltage regulator to a transformer rated 1145 kva,



View of germanium rectifier interior. Note snap-on coolant connectors for individual trays

16,320/54v, and then to rectifier. Current in rectifier sections is measured by three DC measuring reactors, whose outputs are added to give total current and to signal voltage regulator for current control. Regulators and transformers are outdoor, Pyranol® filled units, rated for 45°C temp rise.

Control circuit prevents putting full voltage on electrolytic cells when they are depolarized. Circuit breaker will trip on loss of coolant, coolant overheating, or failure of two pairs of germanium elements in one tray.

(Information on germanium rectifier installation was furnished by John J. Dvorscak, of G-E's Pittsfield, Mass. plant. For further information contact General Electric Co., Dept. CP, One River Rd., Schenectady 5, N.Y. . . . or check 6941 on form opposite last page.)

Careers in chemistry

Aimed at inspiring science-talented high school students to follow scientific careers, 16-page booklet discusses career opportunities in the chemical field, cites application of chemistry in everyday living, and gives indicators for science aptitude.

"Frontiersman of the Future" is issued by Manufacturing Chemists' Assn., Inc., Dept. CP, 1625 Eye St., N.W., Washington 6, D.C. When inquiring specify 6942 on form opp. last page.

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it's plastic and it's practical...

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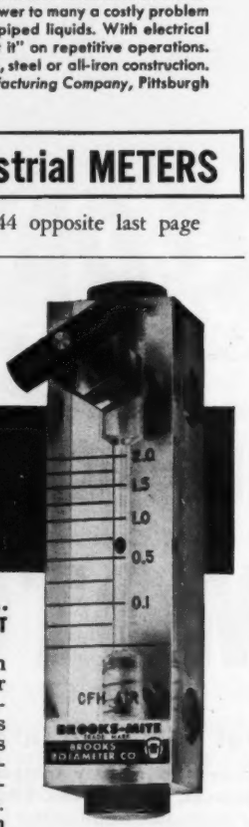


NEW BROOKS-MITE DESIGN... RUGGED... AT LOWEST COST

Here's the well-known BROOKS-MITE Flow Indicator with the new "O" ring construction. Torque limitations of the past are overcome. This is your best meter where rugged service and need for *lowest possible cost* go together.

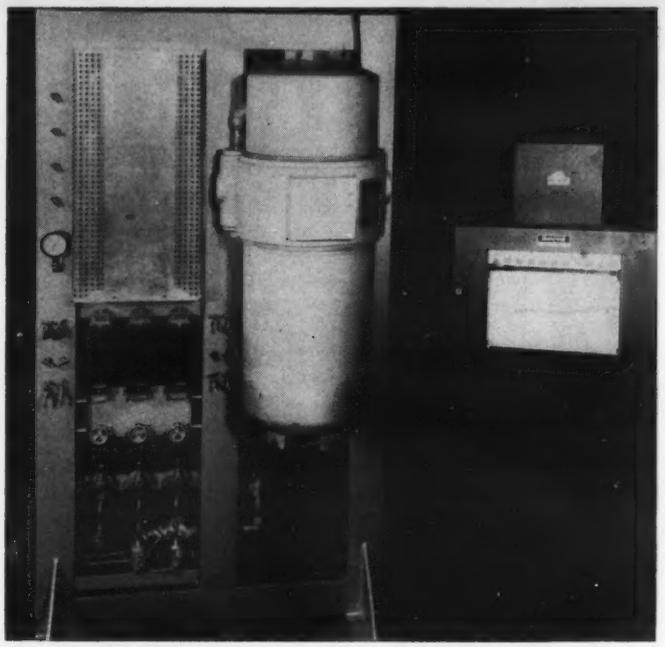
The BROOKS-MITE has an acrylic plastic meter body and is available in 24 flow ranges. Optional features include a built-in FLO-MITE needle valve and integrally piped constant differential relay.

Send For Bulletin No. 120

BROOKS ROTAMETER COMPANY

103 EIGHTH STREET • LANSDALE, PA.

When inquiring check 6945 opposite last page



Complete thermoelectric instrument for measuring and recording concentrations of water continuously. Stainless steel Dewar flask holds detector cell

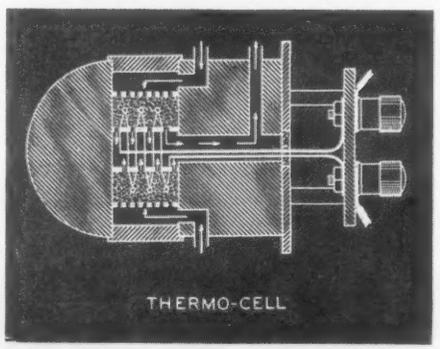
Engineers of Esso Research and Mine Safety Appliances have developed a unique method and instrument for

continuously measuring and recording ppm of water vapor

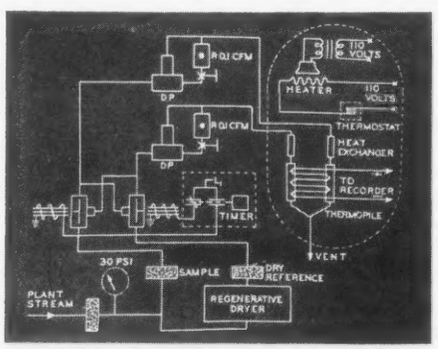
... in air and gas streams. Step-wise shifts in water concentration can be followed in eight to twelve minutes

USES: Continuously measuring and recording concentrations . . . both low and high . . . of water vapor in air or gas streams.

Features: Thermoelectric vapor detector reports water vapor concentration every four minutes. Step-wise shifts in water concentration can be fol-



Vapor detector cell consists of two beds of desiccant in which thermocouples are embedded



Flow diagram of instrument for continuous measurement of vapor in a gas

lowed in eight to twelve minutes. Sensitivity of 0.25 ppm by volume has been attained. Accuracy is limited by noise level and calibration errors to about one ppm.

Description: Unique principle of operation requires that a continuously flowing sample of gas be split into two equal streams. One stream is dried completely by a regenerative adsorption column. The two streams are then directed alternately through two sides of a detector cell. During four minute cycles the desiccant in each side of the cell is exposed alternately to each stream for two minutes.

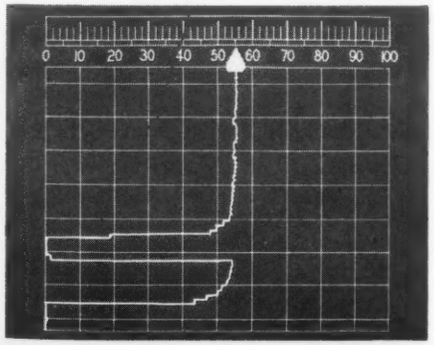
A number of thermocouples in the two desiccant beds develop an electrical potential proportional to adsorption of moisture on one side of the cell and loss on the other side. Reversal of the flow causes a potential of opposite polarity to be generated.

Measurement of the alternating signal is made with a special peak-to-peak voltmeter because signal frequency is only one quarter cycle per minute.

With first applications expected, by development engineers, in monitoring dryness of gas in long pipelines, vapor detector can also be used in maintaining drying efficiency of drying gases. Regeneration can be applied before, or at the same time as, the first water break-through. Similarly, the instrument can be used to prevent moisture damage to process catalysts by monitoring feed streams. Detector is also expected to be useful in developing accurate data on which to base water tolerance limits.

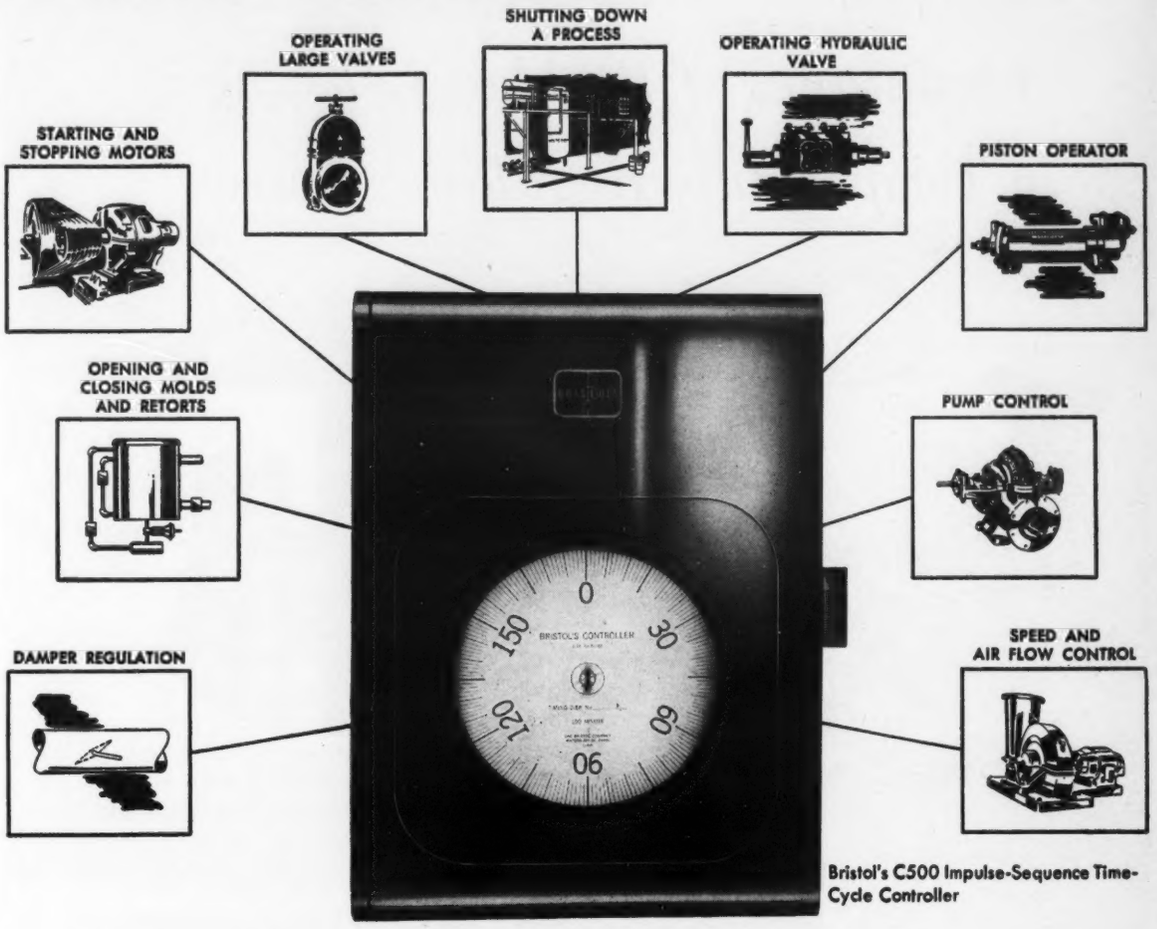
In developing the highly sensitive instrument, more conventional methods . . . as the hair hygrometer, wet and dry bulb . . . were considered and eliminated as not adaptable to continuous measurement and recording. Using the heat of adsorption involved factors of temperature, nature of adsorbent, and quantity of moisture adsorbed — all complicating the task of designing the instrument.

(*Please turn to next page*)



Record of water vapor concentration made by rectifying the swinging signal

WHAT'S NEWS AT BRISTOL . . .



Bristol's C500 Impulse-Sequence Time-Cycle Controller

AUTOMATIC TIMING . . . THE KEY TO AUTOMATION

In almost every plant you'll see operations that *must* be carried out according to definitely timed sequences.

Experience has shown that such operations can be controlled with greater precision by automatic time-cycle controllers than by any other method—and when accurate timing is *continuously* maintained, here are the happy results:

- production from given installed equipment is increased
- uniformity of product is assured
- rejections are almost wholly eliminated
- operators are released for other important duties

Automatic control also puts the process under direct measurement—which means that operating conditions are more easily determinable and more easily reproduced.

Which controller should you select? Hundreds of leading industrial firms, many of them Bristol customers for over 66 years, are using Bristol Automatic Process-Timing Controllers. Our engineers have had long experience in the application of Automatic Process-Timing Controls in practically every industry. They're ready to work on your problem now. Write today for our Bulletin C305. The Bristol Company, 141 Bristol Road, Waterbury 20, Conn.

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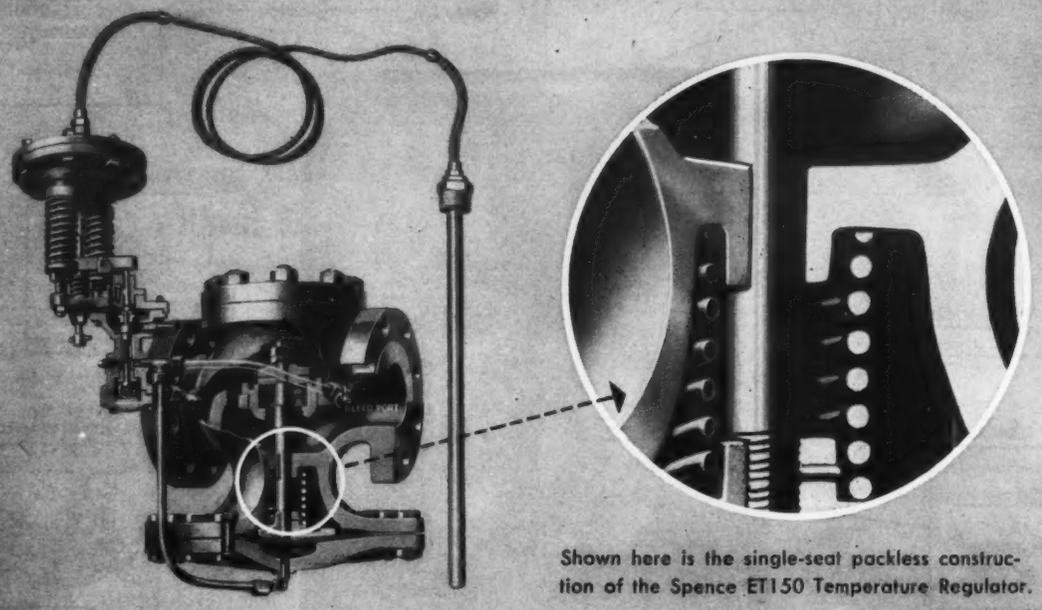
POINTS THE WAY IN HUMAN-ENGINEERED INSTRUMENTATION

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

When inquiring check 6946 opposite last page

VALVE TIPS:

Advantages of Packless Construction in Temperature Regulating Valves



Shown here is the single-seat packless construction of the Spence ET150 Temperature Regulator.

One of the biggest headaches in regulating valve maintenance is repacking stuffing boxes.

How often a valve needs repacking, how much time it takes, and the cost of the system downtime all vary with the construction of the regulator and the service it's used for. No matter how you calculate all these variables it's still a headache—and an expensive one.

In the temperature regulator shown above (Spence Type ET150) stuffing boxes are eliminated. This is done by what is known as "balanced" diaphragm construction. You can see in the cutaway drawing that pressure is applied to both sides of the large metal diaphragm. The upper side is exposed to delivery steam pressure and the lower side is exposed to loading pressure applied by the pilot. When the pilot closes, both delivery pressure and loading pressure are equalized through the bleedport and connecting tubing.

This construction not only does away with repacking problems, but it makes possible additional savings as well. For example, you will note in the sectional blow-up that this design eliminates a closely fitted stem and guide. Dirt or other foreign matter doesn't have much of a chance to lodge between these parts and cause sticking.

Another cause of binding or sticking, uneven expansion of closely fitted parts, is also eliminated with this design. In addition, valve stem wear is reduced for the same reason.

Lower maintenance is not the only advantage of this packless construction. Accuracy of regulation is also improved because friction due to a stuffing box, dirt, or uneven expansion is not a problem. The large, balanced metal diaphragm is more sensitive to slight changes in pressure.

Guaranteed Not To Wiredraw

If seats and discs are cut by steam (wiredrawn) the loss of steam through these grooves can be another expensive item — directly charged against the regulating valve. Fortunately, you can eliminate these costly leaks by specifying a temperature regulator that is *guaranteed not to wiredraw.*

Spence makes such a guarantee because their seats and discs are made of SECO Metal. Over 20 years experience with this special alloy has failed to produce a single case where a SECO Metal seat or disc had been cut by steam. All that's required is an approved strainer located ahead of the regulating valve. Expensive steam leaks just can't happen with this combination of SECO Metal and single-seat design.

If you would like to have more information on Spence Temperature Regulators, drop us a line and ask for Bulletin T150. It gives more detailed information on these and other Spence design features. Piping layouts and helpful information on the installation of temperature regulators are also included. Write for your copy today.

SPENCE ENGINEERING COMPANY, INC.
Walden, New York

SE 140

When inquiring check 6947 opposite last page

Vapor Detector

(*Continued from preceding page*)

The two streams of gas must have substantially constant and equal flow. Switching interval needs to be long enough to permit detector desiccants to achieve an equilibrium with the gas stream. Operational temperature, a few degrees higher than highest ambient temperature expected, has to be maintained with an electric heater and thermostat control. Temperature equalization of gas streams and detector cell must be developed by air circulation through the detector cell chamber.

Two methods of rectifying the swinging signal were developed by Esso Research and MSA engineers to simplify interpretation of recorded measurements. One method uses maximum output of detector cell as stored on a capacitor and impressed on a DC potential. Second method, also used in the finished instrument, employs a mechanical system for rectification.

Vapor detector is calibrated by using a blend of dry stream with a stream of known water vapor concentration in varying proportions. With a thermopile of 36 couples, and the cell filled with a special silica gel desiccant, 7.1 microvolts per ppm were obtained. Noise at this sensitivity is equivalent to less than one ppm.

(Vapor Detector was developed by Esso Research & Engineering Company and Mine Safety Appliances Company, Dept. CP, 201 N. Braddock Ave., Pittsburgh 8, Pa. Check 6948 opposite last page.)

"No, we've never had any trouble cleaning out those columns."

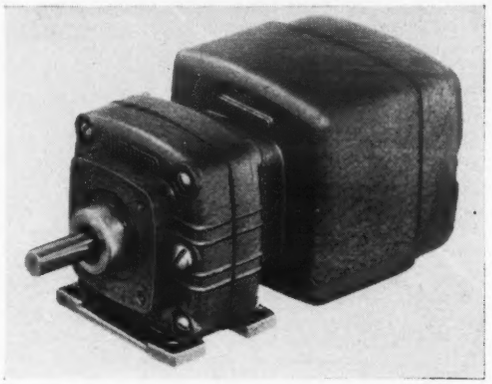
Thanks to Robert M. Barto, Jr., Remington Arms Co., Lake City Arsenal, Independence, Mo.

Measures both low and high rpm for multi-range tachometer . . .

rotation in either direction will operate takeoff head, produce a current linear with speed

Uses: As takeoff head with manufacturer's indicator to measure rpm of both rotating parts and moving surfaces.

Features: Tachometer head will measure both high speeds—5000 to 30,000 rpm—or low speeds —½ to 100 rpm.



Rotation in either direction will operate tachometer takeoff head

Description: Takeoff head consists of a DPDT switch together with a capacitor which act as a speed sensing element. Rotation in either direction will operate the head and produce a current linear with speed of rotation. Polarity of capacitor is reversed by the switch twice each revolution with a frequency proportional to speed being measured. Tachometer head allows multiple-range operation with a wide total range. Takeoff heads can only be used with manufacturer's indicators.

(Series 33 Tachometer heads are product of Metron Instrument Company, Dept. CP, 432 Lincoln Street, Denver 3, Colorado . . . or for more information check 6949 on form opposite last page.)

Discusses magnetic amplifiers for control system

Static control system using magnetic amplifiers is discussed in six-page, two-color booklet. Control system is explained as a replacement for control using relays. Control system is described as using a logic function approach.

Bul B-6584, "Cypak", is issued by Westinghouse Electric Corporation, Dept. CP, PO Box 2099, Pittsburgh 30, Pa. When inquiring specify 6950 on form opposite last page.

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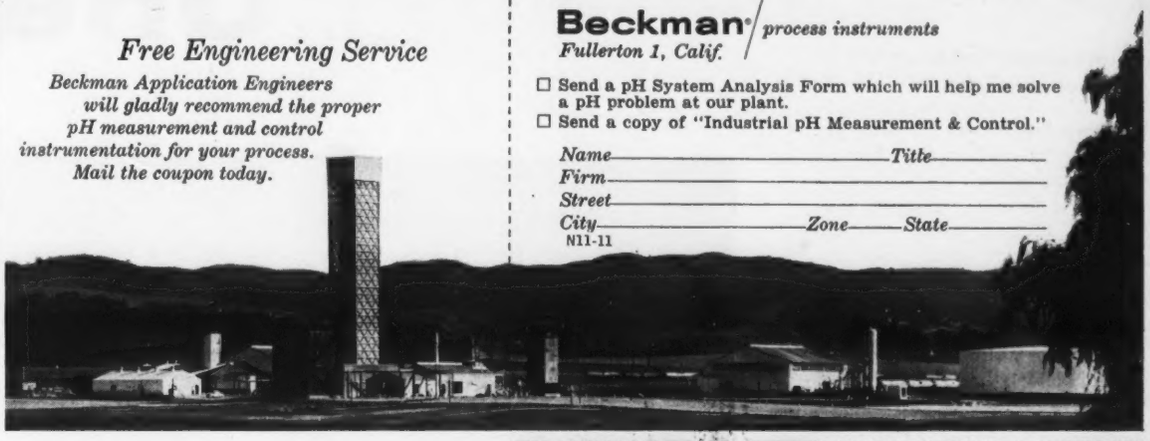
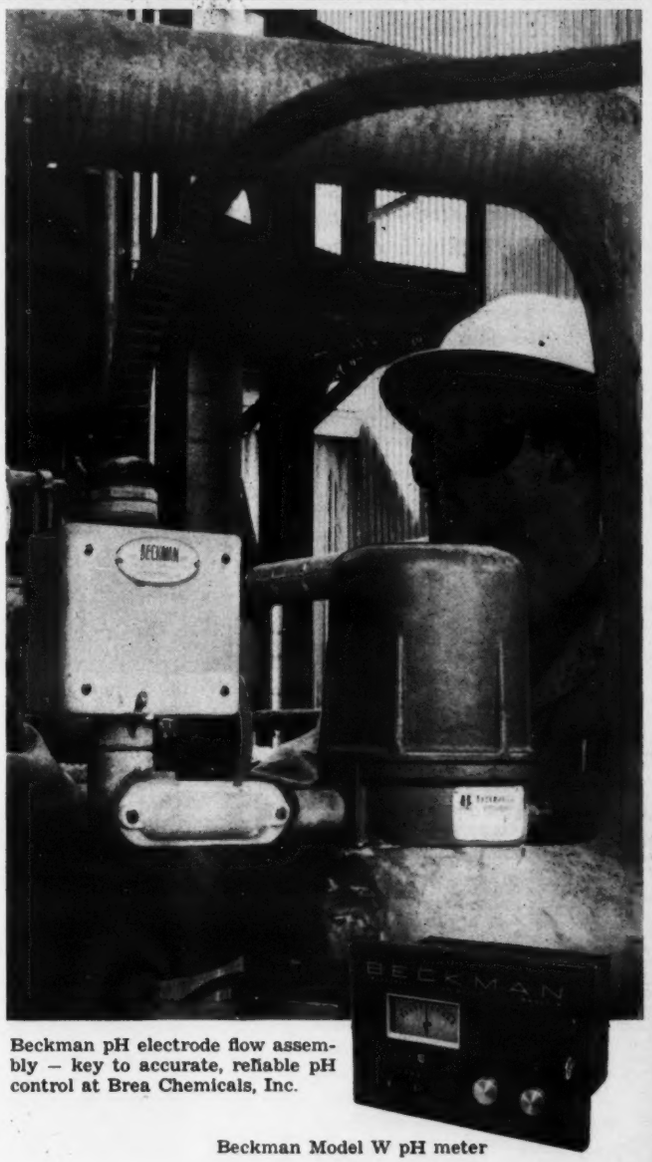


Brea Chemicals, Inc. "prills" ammonium nitrate with Beckman pH control

Brea Chemicals, Inc. new ammonium nitrate plant at Brea, California, combines nitric acid and ammonia to provide a fast-acting, long-lasting fertilizer. Final product is in the form of prills, pellets about the size of birdshot, which are shaped by spraying hot (280°F) ammonium nitrate solution from the top of a 200-foot aluminum tower. As the spray descends against an upward flow of air, it forms into droplets, then cools and solidifies into prills. Accurate pH measurement and control is essential in the process in order to produce free-flowing prills with high nitrogen content (33.5%).

A Beckman pH electrode flow assembly is mounted just downstream of the neutralizer where ammonia and nitric acid are blended. A Beckman pH meter and a recorder are located in a nearby control room and ammonia feed is regulated manually to hold pH around 4.5. Ultimately, Beckman pH instrumentation will serve as the key to fully automatic control of the process. For more information on how Beckman pH control can work for you, mail the coupon today to Beckman Instruments, Inc., Process Instruments Department, Fullerton, California.

Beckman® / *process instruments*



Beckman pH electrode flow assembly — key to accurate, reliable pH control at Brea Chemicals, Inc.

Beckman Model W pH meter

When inquiring check 6951 opposite last page

Shows circuit "restorer" for thermocouples

Describing device for renewing electrical conductivity through thermocouples and thermocouple circuits, eight page bulletin in two colors also explains operational principle. Diagrams, installation photographs, and recorder chart illustrate how the device monitors thermocouple circuits and restores them to use.

Catalog R-26 is issued by The Peerless Electric Company, Electronics Division, Dept CP, Warren, Ohio. When inquiring, specify 6952 on form opposite last page.

Uses pneumatic element for process control of viscosity . . .

time required for piston fall indicates measure of viscosity

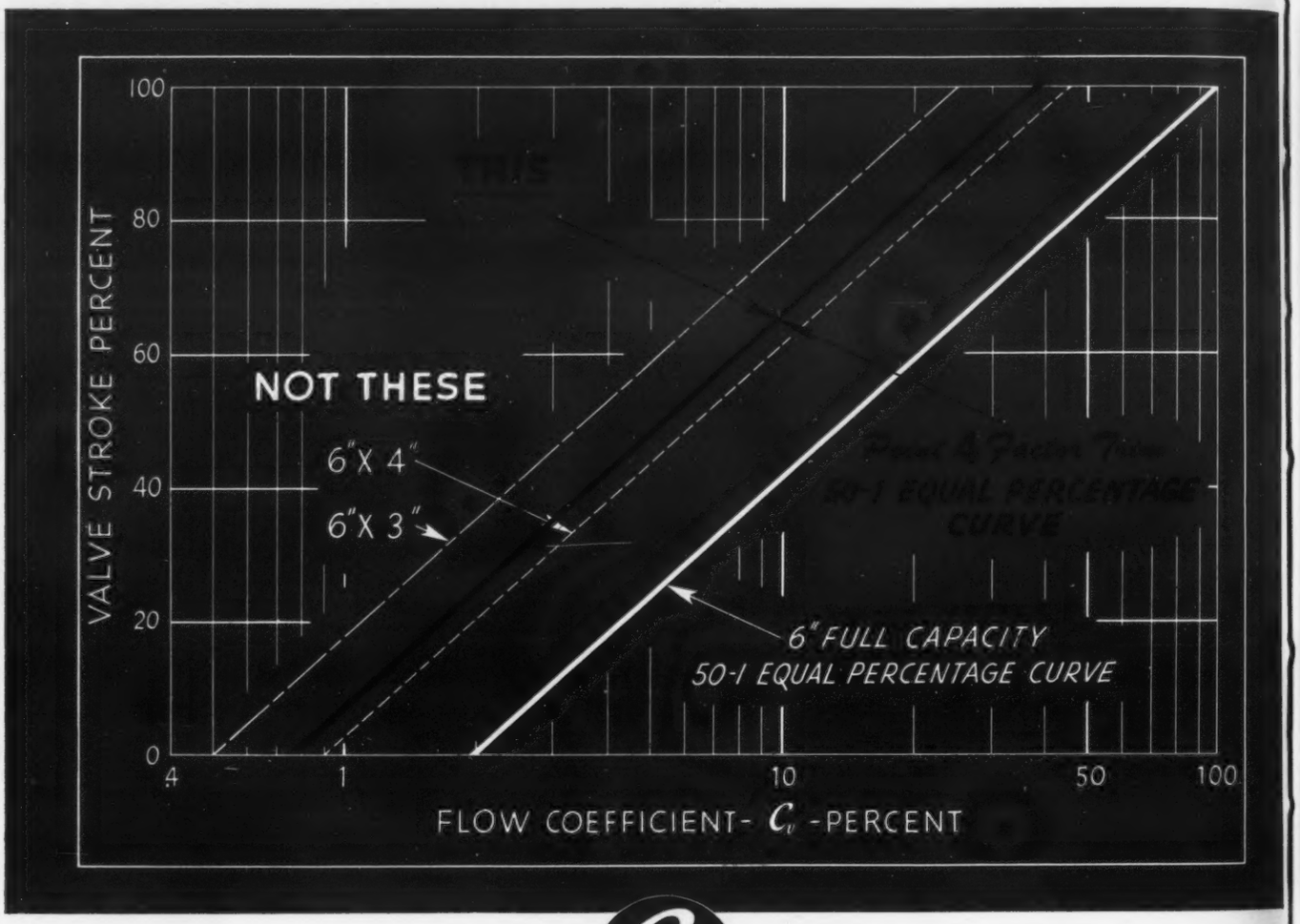
Uses: Controlling viscosity where solvent must be added to correct evaporation losses as in coating processes.

Features: Automatic viscosity controller uses an air-operated measuring element.

Description: Air cylinder is used to raise a piston and draw sample into measuring element. Time required for piston to fall by gravity is measure of viscosity. Control station measures time of fall and opens valve to add solvent when necessary.

Air supply required is approximately 50 psi. Pneumatic pressure is controlled by air valve, being tied in with both control and measuring element. Probe is stainless, steel and mounting specify 6952 on form liquid from 6 to 30 inches. Weight of unit is approximately

One Size...



A HIGH C_Q (Quality Coefficient) PRODUCT

Point 4 Factor Trim

is the answer to those few types of applications where reduced capacity trim is required. It is available in V-port and solid turned designs for double or single seated valves and in a wide variety of materials. Send for Data Sheet No. 10-5.

Not Two

Masoneilan *Point 4 Factor Trim* offers the ONLY REALISTIC approach to selection of reduced capacity trim

It is a DEMONSTRABLE Fact
that for a given size top-and-bottom guided valve only *one* size reduced capacity trim is:

Desirable **from an engineering standpoint because . . .**

(a) properly designed wide-range valves with full capacity trim will handle a vast majority of control problems.

(b) if any reduction is required, it must be substantial to be of any advantage.

(c) any sound design must be based on a reduction in seat ring diameter.

(d) rule-of-thumb trim reductions based on nominal *pipe* sizes are unnecessary and merely complicate the sizing problem.

Practical **from manufacturing and operating standpoint because . . .**

(a) mechanical strength is retained with standard guide and stem diameters and standard stroke, in combination with maximum reduction in seat diameter.

(b) reduction in number of parts simplifies stock problem.

(c) forged and cast forms insure complete uniformity of parts.

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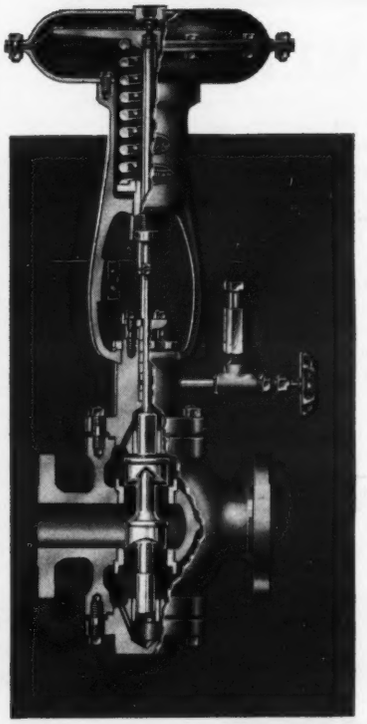
Division of Worthington Corporation

25 NAHATAN STREET, NORWOOD, MASSACHUSETTS

Sales Offices or Distributors in the Following Cities: New York • Syracuse • Chicago • St. Louis Tulsa • Philadelphia • Houston • Pittsburgh • Atlanta • Cleveland • Cincinnati Kansas City • Phoenix • Detroit • San Francisco • Louisville • Salt Lake City • El Paso Albuquerque • Charlotte • Los Angeles • Corpus Christi • Denver • Appleton • Birmingham New Orleans • Dallas • Seattle • Mason-Neilan Regulator Co., Ltd., Montreal and Toronto



16 pounds. Unit requires 110v, 60 cps AC. Instrument can be applied to control viscosity of liquids ranging from 0.2 to 200,000 cp.

(Viscosity control is product of Norcross Corp., Dept. CP, 247 Newtonville Ave., Newton 58, Mass. . . . or check 6953 on form opposite last page.)

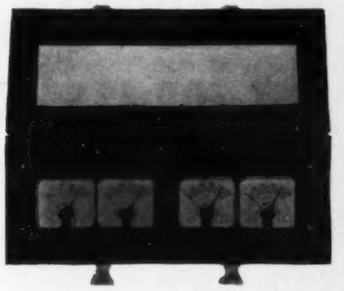
Protects meter-relays in moisture laden atmospheres . . .

one to four controls can be included in housing

Uses: Protecting manufacturer's meter relays in moisture laden atmospheres, or in presence of mild chemicals.

Features: Cabinet is gasket sealed and of aluminum construction.

Description: Cabinet will contain from one to four contact meter-relays. Front is upward-



Cabinet protects against action of weather

swinging and is locked in place with two ¼-turn fasteners. Electrical connections are made with weather-tight connectors or conduit. Cabinet can be used in installations exposed to the weather.

(Weather-Tight cabinets are product of Assembly Products, Inc., Dept. CP, Chesterland, Ohio . . . or check 6954 opp. last page.)

For more information on product at left, specify 6955 . . . see information request blank opposite last page.

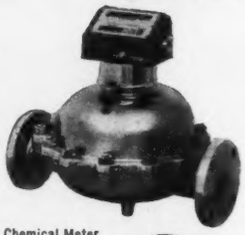
ELIMINATE ERRORS in BATCH MIXING

with

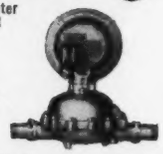
NIAGARA *Automatic Displacement Meters!*

SET FOR 175 gallons—GET 175 gallons

Uniformity of a liquid product depends on accurate measurement of all ingredients from batch to batch. You can be sure of consistent accuracy by equipping with Niagara Electri-contact Meters. A precision electric Switch closes or opens an electric circuit after the passage of a predetermined quantity of liquid through the meter. Can also be used to generate electrical impulses to actuate other control mechanisms . . . shut off a pump motor . . . signal visually or audibly to the operator. Brings automation to liquid control and measurement in hazardous or non-hazardous atmospheres.



Chemical Meter with inclined register.



Rear View. Explosion Proof Meter.

Begin now to lower your liquid measuring costs and have the assurance of positive accuracy. Mail coupon for complete information.

Please send me complete information on the use of economical NIAGARA METERS, based on the data below:

Liquid..... Pressure.....p.s.i.
Temp.....°F.
Flow rate.....g.p.m.
Maximum batch.....gals.
Name.....
Company.....
Address.....

BUFFALO METER CO.
2892 MAIN STREET
BUFFALO 14, NEW YORK

See us at the ISA Instrument Show in September

When inquiring check 6956 opposite last page

Covers controls and equipment for storage tanks

Including a technical section on tank storage conservation, vapor recovery, and vapor balancing systems, general catalog describes tank equipment, gas control and safety devices, automatic gas control equipment, electronic remote liquid-level gaging and pulse code telemetering systems.

Data included in the technical section are API guide for tank venting and roof manholes, chemical resistance of materials, conversions, selection of corrosion-resistant materials. Catalog is about 175 pages and includes much information of value on operation of large tank farms or of single tanks.

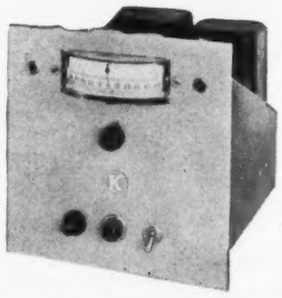
Varec catalog P-7R is issued by the Vapor Recovery Systems Co., Dept. CP, 2820 N. Alameda St., Compton, Calif. When inquiring specify 6957 on form opposite last page.

Automatically controls quality by monitoring two components of process stream . . .

senses deviations in absorption bands and gives audible or visual warning

Uses: Continuously monitoring and controlling process variables through optical measurement and analysis in titration, automatic control of process factors, detection of water vapor in gas, pipeline batch metering, other measurements.

Features: Spectrographic controller allows simultaneous monitoring of color and turbidity, or two or more components of a stream with a single instrument. Observations may be in the range from ultraviolet to near infrared.



Control unit for optical monitoring system

Description: Optical control system consists of an integrated line of components which can be assembled in a number of different ways. Operation depends on sensitivity to an actual change in the absorption bands, achieved by splitting a beam between two or more detectors of different spectral sensitivity. Instrument monitors the absorption deviation from a pre-selected standard and indicates direction of deviation, giving visual or audible warning when beyond limits. Optical observations can be made in ultraviolet, visual, and near infrared.

Increase your process efficiency with accurate quality control

Increased process efficiency and precise quality control are only two of the many advantages that result from the application of continuous process refractometry to chemical process streams. This unique physical principle is a quick and simple method of determining whether a specific material, or mixture of materials, meets required specification...

Product variations can be detected with great rapidity because a sample from the process stream itself is continuously flowing through the instrument and is compared with a reference standard. The process can be adjusted to maintain product characteristics within the desired tolerance, with a minimum of sub-standard throughput. These savings alone can quickly pay for the cost of an instrument.

APPLICATIONS—The Barnes Differential Refractometer has wide applications in the chemical, food, refinery and other process industries. Many processes in these industries have used continuous process refractometry for years to monitor product quality. For example, refractometry may be used to control:

Hydrogenation—of fats and oils in food and chemical streams;
Polymerization—of hydrocarbons, vinyls, styrenes, etc.;
Distillation—of petroleum or other fractions;
Blending—of binary mixtures.

OPERATION—The Barnes Refractometer measures an *unchanging* and *basic physical characteristic of a material:* refractive index. This gives a *true* measurement of stream composition—not a measurement of an environmental variable such as temperature, pressure, flow rate, etc.

The Barnes Refractometer provides a continuous indication of the difference in refractive index between the reference liquid and the continuously flowing sample from the process stream. Differences may be indicated on a scale at the front of the instrument, or they may be transmitted as electrical signals to a recorder controller.

SPECIFICATIONS—The Barnes Refractometer has an accuracy of better than ±½% and is available in three models with limiting sensitivities of refractive index covering 0.0001, 0.00001, 0.000002. The optical system is sealed against contamination; the entire instrument is explosion-proofed; the servo measuring system is of the null balance type for highest accuracy.

The Barnes Application Engineering Group is ready to assist you in evaluating the use of refractometry to your control problems. Special Data Sheets to help better service your problems are yours for the asking.

Complete description of the Barnes Refractometer and Data Sheets will be mailed upon request. Barnes Engineering Company, Stamford, Conn.

BARNES ENGINEERING COMPANY
CONTROL THROUGH ANALYSIS

When inquiring check 6958 opposite last page

Operation is based on a servo self-balancing null system. Error signal generated by difference between two beams will have a phase and magnitude depending on relative strength of incident energy beams. After amplification, error signal drives servo motor reducing error signal to zero. A second servo motor is provided for remote calibration and zeroing.

Instrument is supplied in both regular and explosion-proof housings. Sensing unit may be remote from indicating unit.

(Spectrostat is product of Kaye Development Co., Dept. CP, Connecticut Ave., South Norwalk, Conn. . . . or for more information check 6959 on form opposite last page.)

Converts analogs to digits from as many as 1000 process points . . .

data handling system retains accuracy of value being read to within 1/10 of 1%

Uses: Recording temperatures, pressures, flows, other physical variables of plant processing stream from many process points.

Features: Data handling system has capacity of receiving up to 1000 different inputs from sensing instruments and retains accuracy of value being read to within 1/10 of one per cent.

Description: Analog-to-digital converter transforms electrical measurements into numerical form. Performance data are logged out on paper tape, punch cards, or on automatic typewriters. Two typewriters are provided with system, one for logging and the other for alarm. Logging typewriter prints out information from all channels in intervals of 3, 6, 15, 30, or 60 minutes. Detection of alarm point actuates signal to light an alarm light or ring a bell. Also, an alarm typewriter prints in red the time, channel number, and alarm data. Pinboard programmer gives digital control over scaling, zero offset, linearizing, alarm limits, totalizing, and readout.

Pinboard programmer handles as many as 1000 different inputs

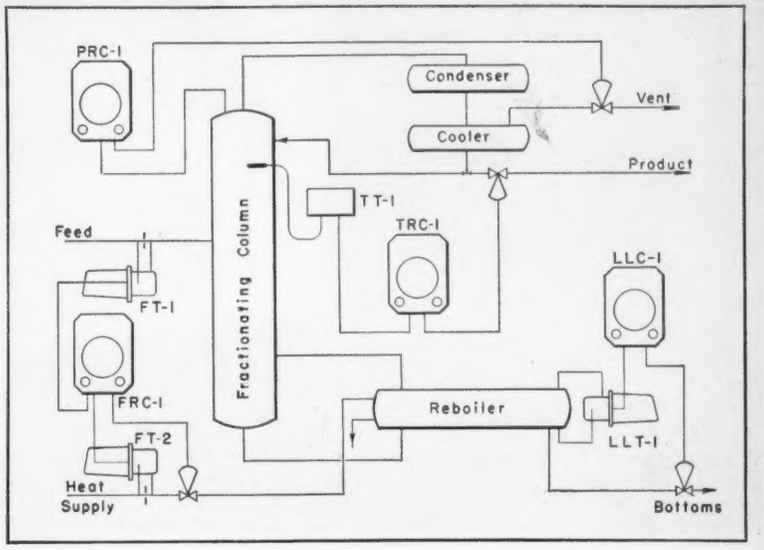
(Data Handling System is product of Beckman Division, Beckman Instruments, Inc., Dept. CP, Fullerton, Calif. . . . or for more information check 6960 on form opposite last page.)

CONTINUOUS DISTILLATION COLUMN CONTROL

One of a series of basic instrumentation recommendations for the unit operations

GEORGE E. HOWARD, Manager Application Engineering Dept.

"Unquestionably, our reputation for successful distillation column control is based on broad experience with every type of distillation problem, and a complete line of instruments that meets every need."



PROBLEM

To operate a continuous distillation column at maximum efficiency, and at the same time produce an overhead product of the required purity.

SOLUTION

The proper application of control instruments, as illustrated, will assure that the critical process variables are continuously maintained at the best operating values.

Pressure controller PRC-1 controls pressure at the top of column by regulating the venting of non-condensibles from the condenser. Precise control of pressure is essential to good composition control.

Since the liquid and vapor phases are in equilibrium at any point in a column, and since pressure is precisely maintained, temperature is a measure of composition. Transmitter TT-1 measures the temperature at a point as near the top of the column as possible, yet at a point where equilibrium temperature is a significant measure of composition. TRC-1 therefore records composition in the column, measured as a temperature, and controls it by regulating the rate at which the reflux is returned. Thus a means is provided for continuous control over the purity of the product by controlling composition as near the top of the column as possible.

The heat supply to the reboiler is automatically controlled in relation to the feed rate so that no more heat need be used than is necessary for the required stripping.

Flow transmitter FT-1 measures the feed rate while FT-2 measures the heat supply rate. FRC-1 is a recording flow ratio controller which automatically controls the flow of the heat supply at the predetermined optimum value relative to the feed rate. Thus the column is always operated at maximum efficiency.

The liquid level in the reboiler is measured by a differential pressure transmitter LLT-1. Instrument LLC-1 indicates the reboiler level, and controls it by regulating the rate of discharging bottoms product. This accomplishes two things; first it maintains the best level for efficient use of the available heating surface in the reboiler, and second it assures that bottoms product will be discharged at a steady rate corresponding to the rate at which component separation is being accomplished in the column.

BENEFITS

1. Continuously guards product purity.

2. Keeps cost of heat supply to a minimum.

3. Reduces manual attention, and possibility of human error.

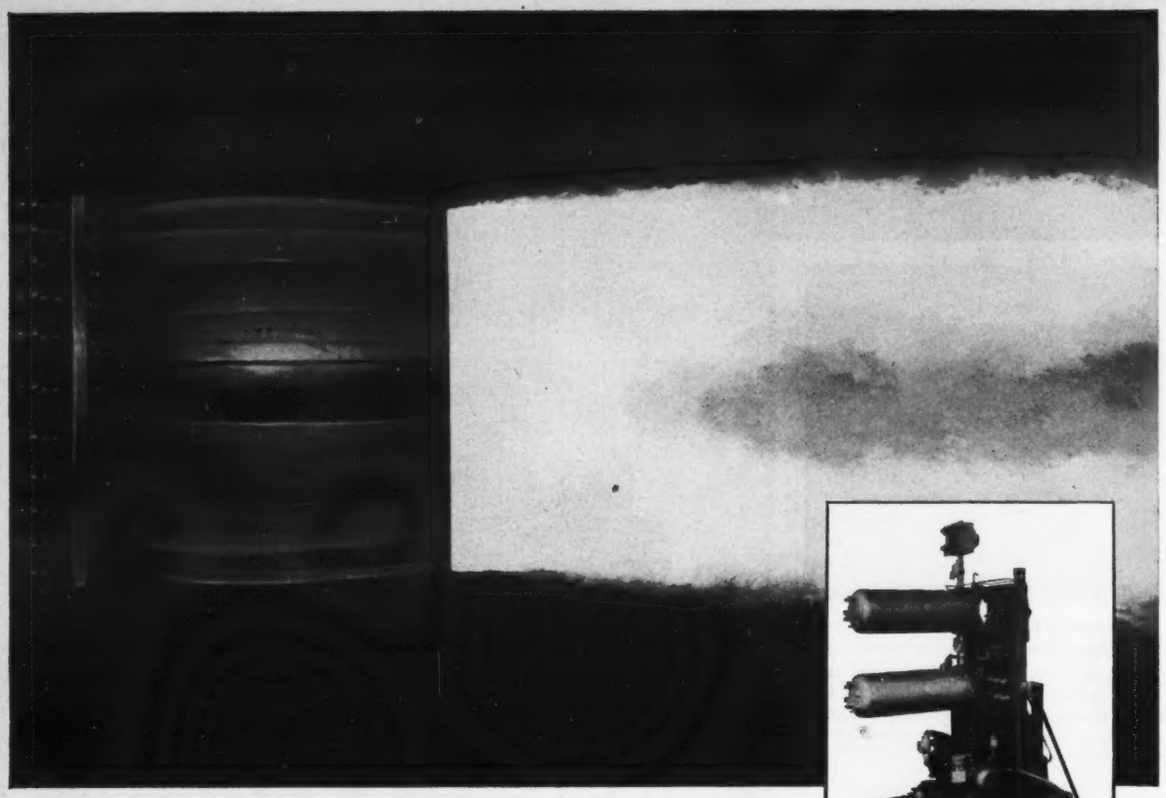
4. Provides valuable chart records of column operation.

• •

Send for Data Sheet No. 11 for other control recommendations for batch and continuous distillation; or call in your Taylor Field Engineer. Taylor Instrument Companies, Rochester, N.Y., and Toronto, Canada.

Taylor Instruments MEAN ACCURACY FIRST

When inquiring check 6961 opposite last page



With continuous analyzer,
Pratt & Whitney Aircraft gets

EXHAUST GAS ANALYSIS IN 30 SECONDS

Tests jet afterburner components

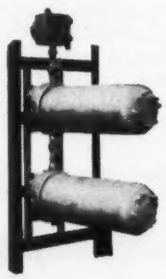
In test set-ups on jet afterburner components, Pratt & Whitney Aircraft uses a P-E TRI-NON® continuous infrared analyzer to run a differential analysis on exhaust gases before and after fuel injection in the afterburner. This is accomplished by means of a reference probe in the gas stream before fuel injection, and a movable probe in the stream after injection. The probes move in a set pattern, and differential readings are made at many points in the gas stream. Results indicate the distribution of fuel as it is injected into the afterburner, and tell the test engineer:

(1) whether efficient burning is being accomplished.
(2) whether heat distribution is uniform, so that local overheating of metal is avoided.

The Tri-Non time constant of less than a second permits an overall system response of 30 seconds per reading with an accuracy of ±1%.

This type of application for the TRI-NON Analyzer has possibilities in industries other than aircraft. Automobile designers working with cascaded systems, oil companies doing fuel and combustion research, and chemical engineering groups have shown considerable interest.

When you specify continuous analyzers for your process streams, only P-E has a complete line of instruments to choose from. Or let us develop a complete analytical control system for you. Nowhere else can you get the combination of chemical engineering and instrument knowhow that you'll find at P-E.



P-E TRI-NON Analyzers are available in a wide range of models and prices to meet all types of continuous analytical problems. They are rugged and dependable, expressly designed for use in the varied environments of a processing plant or refinery. For quick and easy maintenance, instrument components can be tested right on stream — without disconnecting.

Perkin-Elmer
CORPORATION
Norwalk, Connecticut

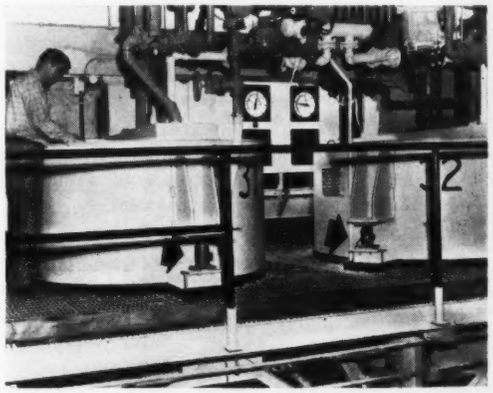
When inquiring check 6962 opposite last page

Batch by weight...

Plastic coating compound is batched with proportioning and mixing

Automatic batching and mixing equipment now used to produce SuperSanitas fabric wall covering has evolved with the product. More than forty years ago it was mixed in fifty gallon batches with lab control for each batch. Three years ago an ingredient change (latex for linseed oil) made it possible to produce 400-gallon batches. Today routine operation calls for 1000- and 1500-gallon batches under automatic control except for addition of minor constituents.

In order to achieve this, three 10,000-lb, precision, bonded-wire strain gages are used to support each of the 1000- and 1500-gallon tanks. Empty tank weight



Control system for batching can be seen between tanks. Note strain gages (arrows)

is about 3000 lb; at full load tanks weigh 18,000 lb. Five timers for each tank are also basic to batching control. These govern duration of the mixing cycle.

Though weighing and mixing take place at the same time, they are independent of one another. In a typical batch three major ingredients — water, resin, and pulverized clay — are fed in sequence. Water is admitted until a prescribed amount is in the tank. Acting on signal from the strain gages, controller now shuts off water and begins to admit resin. At about the same time a timer starts tank's mixer.

But before all the resin has been added, timer stops the mixer so that churning will not throw off readings of the strain gages.

As before, resin flow is stopped when critical weight is reached. Controls now start pulverized clay conveyor. Mixing is again interrupted for accurate weighing. Minor ingredients having been added by

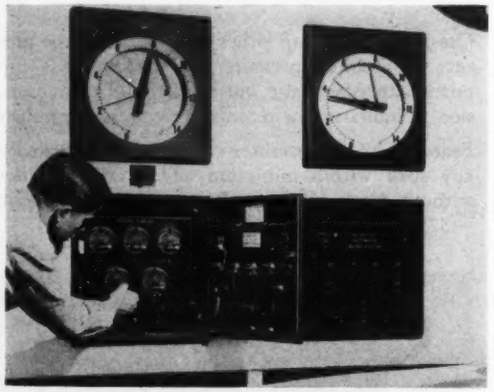
...check by volume

in 1000- and 1500-gallon lots automatically controlled

hand, clay finishes the batch. All valves are closed at this point and there is a thirty minute delay for mixing. After this, discharge valve opens to drain the tank.

Coming into play at this point, electrical interlock prevents feeding new material to the tank or starting a new cycle. Discharge valve must be closed before tank will accept a new batch.

Two batch formulas are used. The second consists of water and latex with minor ingredients. Normally these two formulas are mixed in separate tanks, but either may be made in any tank. Separate timers are



Close-up shows operator changing control program. Recording controller and timer set comprise controls for one tank

used with new setpoints for weights. Formula is selected with a two-position switch.

Proportioning accuracy of one-half percent becomes meaningful when addition rates are considered — clay is delivered at 5.5 lb/sec, liquids admitted through two-inch lines.

Included in the system are volumetric meters for 1) checking and 2) manual operation, if needed. Automatic system maintains one-half percent accuracy without correction, however, and these meters play no part in the control.

Both efficiency and accuracy of formulation have been improved by this system, and far fewer laboratory checks are needed.

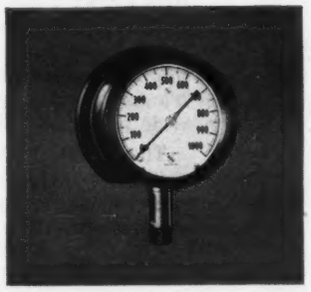
(Batching system was engineered by Baldwin-Lima-Hamilton Corp., 940 Simpson St., Dept. CP, Philadelphia 42, Pa. . . . or for more information check 6963 on form opposite last page.)

Why does the BOURDON TUBE in the ASHCROFT DURAGAUGE insure sustained accuracy?

FOR FAST SERVICE, get in touch with your Industrial Supply Distributor. He is fully acquainted with Ashcroft Duragauges and their proper selection for all kinds of applications.

8 TUBE MATERIALS permit selection of the *best metal* for particular service conditions. These materials include phosphor bronze, alloy steels, "K" Monel, stainless steels, and beryllium copper.

Every Bourdon tube used in the Ashcroft Duragauge is extra-wide – highly sensitive to slight pressure changes. Socket and tip joints are welded or brazed, then stress relieved after assembly, to assure maximum safety and uniform structure for highest corrosion resistance and strength. Each tube assembly is "whip tested" at pulsating pressures approximately 50% higher than its pressure rating to insure calibration stability.



The Ashcroft Duragauge is available with all-stainless-steel movement or stainless steel with nylon bearings and pinion gear. A choice of case designs and materials, dial sizes and pressure ranges readily satisfy the most exacting requirements. Whatever the working pressures or corrosive conditions of your operations, specify Ashcroft Duragauges and be sure of highest sustained accuracy and long service life.

1850 ASHCROFT U.S.A

MAXWELL MANNING & MOORE INC. TRADE MARK

In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario*

ASHCROFT GAUGES

A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONNECTICUT

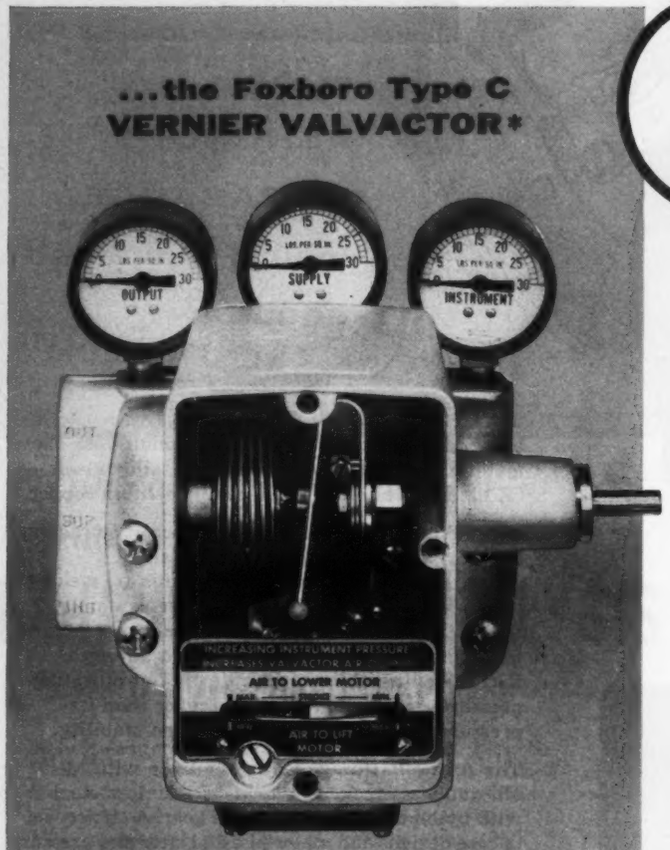
MAKERS OF 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN-MICROSEN' INDUSTRIAL ELECTRONIC INSTRUMENTS, *Stratford, Conn.* 'HANCOCK' VALVES, *Watertown, Mass.* 'CONSOLIDATED' SAFETY RELIEF VALVES, *Tulsa, Oklahoma.* AIRCRAFT CONTROL PRODUCTS, *Danbury & Stratford, Conn. and Inglewood, Calif.* "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES, *Muskegon, Mich.*

When inquiring check 6964 opposite last page

NEW!

MOST UNIVERSALLY ADAPTABLE VALVE POSITIONER ON THE MARKET!

...the Foxboro Type C VERNIER VALVACTOR*



The Type C Valvactor's distinctive motion-balance principle of stem positioning eliminates loading effects of heavy fixed-stroke actuating springs. Note compactness — the simplest mechanical design of any valve positioner.

*Trademark of a precision valve positioner made by The Foxboro Co.

Unique Flexibility Easily reversible in seconds. Sequencing by two simple adjustments.

Super Response Full air-pressure output to diaphragm motor on signal air-pressure change as small as ½ of 1% of signal span.

Extra Speed New, high capacity relay provides high speed positioning action.

Positive Positioning Direct, motion-balance feed-back assures instantaneous, pin-point positioning.

Now there's a positive-action, super-precision valve positioner that you can easily adapt to *any* diaphragm motor application — without exchange of parts! It's the Foxboro Type C Vernier Valvactor with unique motion-feedback.

The Type C Valvactor has a master setting disc which provides easy change of action as required by the control system, as well as easy reversal of Valvactor action for air-to-open or air-to-close control valves. Adjusting for limited stem travel is equally simple ... sequencing of several valves is a cinch!

The Valvactor is the ideal solution to such problems as stem friction, plug friction, valve motor and transmission line lag, and extreme process line pressure changes. And it requires practically no maintenance! Available with 3-gauge and by-pass manifold, or plain manifold. Write for full details.

The Foxboro Company, 818 Neponset Ave., Foxboro, Mass., U.S.A.

FOXBORO
REG U.S PAT OFF
VALVE POSITIONERS

When inquiring check 6965 opposite last page

Compilation on performance of DC amplifier

Consisting of a compilation of articles on manufacturer's DC amplifier, booklet of 16 pages gives performance, applications, and range of unit. Additional references are listed. Block diagrams and wiring circuits are included. Amplifier described can be used as an integrator, control unit, sensitizing amplifier, and a photocell range network.

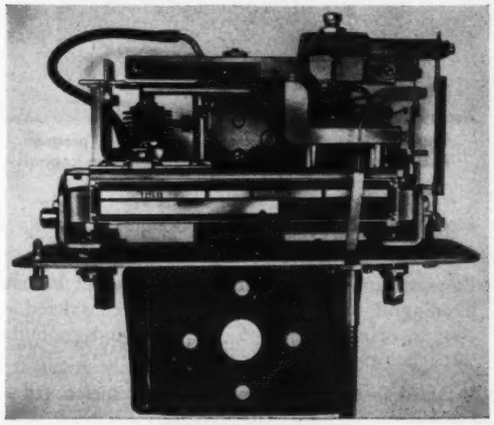
Bulletin "Weston Inductronic Instruments" is issued by Weston Electrical Instrument Corporation, Newark 5, New Jersey. When inquiring specify 6966 on form opposite last page.

Converts temperatures and process pressures to psi output . . .

pneumatic transmitter can be adjusted to measure either variable through varying span

Uses: Measuring either temperature, gage pressure or absolute pressure, and producing a proportionate pneumatic output signal for transmission to indicating or recording receivers, controllers.

Features: Transmitter can be field calibrated to any span within minimum and maximum limits without parts change. Range limits are from −375°F to +1000°F or 20 psi to 600 psi.



Inside of transmitter which can be used for transmitting either temperature or pressure measurements

Description: Pneumatic transmitter operates on a force-balance principle. Pressure, either from thermal system or pressure seal is converted to force at capsule diaphragm. This force is transmitted through a beam to operate a flapper valve according to increasing or decreasing input pressure. Nozzle pressure is amplified and then transmitted to produce an output air pressure propor-

tional to process temperature or pressure. Output air pressure is then transmitted to a pneumatic receiving instrument.

Transmitter span can be field-adjusted to any value within span limits of 20 psi and 50°F minimum and 150 psi and 400°F maximum. Instrument is compensated for ambient temperature change by means of a bi-metal element. Barometric pressure compensation is provided by an evacuated barometric bellows. Bi-metal effect is removed to measure pressure; barometric bellows is removed to measure gage pressure. Units are shock mounted to reduce effects of external vibration.

Supply air pressure should be 18 to 22 psi. Air consumption is less than .02 scfm in balanced condition. Transmitted air pressure is three to fifteen psi. Dimensions are 6½ x 11¾ x 6¾ inches. Mounting can be for either wall or pipe.

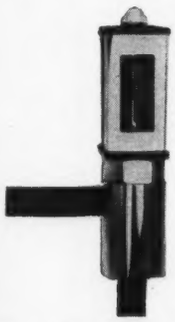
(Tel-O-Set Transmitter is product of Industrial Div., Minneapolis-Honeywell Regulator Co., Dept. CP, Wayne & Windrim Ave., Philadelphia 44, Pa. . . . or for more information check 6967 on form opposite last page.)

Armored flow rate indicator handles pressures to 1500 psig . . .

no glass parts are in contact with metered fluid and flow is indicated by magnetic follower

Uses: Indicating flow in high pressure applications as purge fluids, pump seal fluids, oil for bearings.

Features: Armored flow meter will indicate flow at pressure to 1500 psig. Unit is easily disassembled for cleaning or range change without removal from pipe line.



Flow meter can be disassembled for range change without removal from pipe line

Description: Flow is indicated by tubular follower magnetically coupled to an extension on tapered plug in fixed orifice which measures flow rate. Stuffing boxes are eliminated by positive O-ring seal. Five plug and orifice sets cover flow range from 1.5 to 180 gph in same meter body. Construction is 316 stainless steel with option of carbon steel or brass. Connections are ½" NPT.

(Model 3602 Flow Meter is product of Brooks Rotameter Company, Dept. CP, Lansdale, Penn. . . . or for more information check 6968 on Reader Service slip opposite last page.)

IS SCHOOL OVER . . . *for any of us?*

Those of us in process control work realize that learning, too, is a continuous process. If we are to produce high quality products at minimum cost, we must apply the *right* tool for each process control job. Before we can select intelligently, however, we must learn and understand how all available tools work and how each is used. A rapidly expanding and changing technology further complicates the picture, with the result that school is never really over . . . for any of us.

An excellent instrument "refresher course" is available this year; the 11th Annual Instrument-Automation Conference and Exhibit, to convene at the New York City Coliseum, September 17th to 21st.

Instrument manufacturers will exhibit and describe their latest equipment. Classroom sessions will be conducted daily. Instrument users and manufacturers will learn more of product uses, and needs.

Milton Roy Company will be there, at booths 714, 715 and 716. We hope that we will have the opportunity to explain our equipment to you, and its application to your specific chemical metering needs. If you can't attend, then write for the "textbooks" listed below. They contain the "what", "why" and "how" of controlled volume pumping and, probably, the economical solution to your chemical feed problem.

Bulletin 455 "*Controlled Volume Pumps in Paper Making*"

Bulletin 953 "*Controlled Volume Pumps in Industrial Water Treating*"

Bulletin 1253 "*Controlled Volume Pumps in Process Instrumentation*"

Milton Roy Company, *Manufacturing Engineers*, 1300 East Mermaid Lane, Philadelphia 18, Pa.

Engineering representatives in the United States, Canada, Mexico, Europe, Asia, South America and Africa.

milton Roy
CHEMICAL FEED SYSTEMS

When inquiring check 6969 opposite last page

Describes flow meter that pumps

Eight page, three color bulletin illustrates an improved model of manufacturer's meter that pumps. Brochure features detailed schematic drawing of the unit. Capacity tables, to maximum rate of 6 gph, are listed.

Bul No. 300 is issued by Hills-McCanna Company, Dept. CP, 3025 N. Western Ave., Chicago 18, Illinois. When inquiring specify 6970 on form opposite last page.

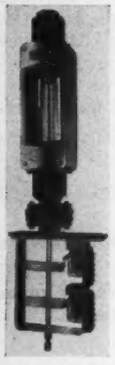
Sets off alarm signal for high and low flow limits . . .

switch is insensitive to vibration, won't give false alarms

Uses: As control to start a pump, close a valve, shut down a system, and perform other on-off control functions according to rate of flow.

Features: Flow alarm is insensitive to vibration and won't give false alarms.

Description: Instrument uses two snap-action electrical contacts, sealed in a glass tube, drawn together to set off an alarm by passage of a magnetic float extension rod. Switch can be positioned on mounting frame either above or below magnet in float extension rod. Signal can thus be given by either high or low limits of flow. Unit has fail-safe design; signal always results if alarm circuit fails. Flow alarm is supplied with a dust-proof, plastic enclosed, plug-in relay to allow easy inspection of contact points. Manufacturer has standardized on magnetic



Flow limits give alarm

from -325F to 3000F

WORLD'S MOST COMPREHENSIVE LINE OF TEMPERATURE INSTRUMENTS

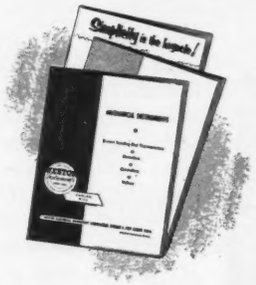
Here's a time-saving, money-saving tip. Whenever you have a temperature problem . . . whether it involves simple, but accurate indications or intricate, sensitive control . . . call on WESTON. From WESTON'S comprehensive instrument line you can readily select . . . *you are sure to get* . . . the temperature instrument exactly suited to your requirement.

For simple indications . . . Weston provides the famous all-metal thermometers — or the filled system types for remote readings — or electrical resistance and thermocouple types.

For recording . . . select from a complete line of filled system recording thermometers — single or multi-point electronic recorders — or, where instrument flexibility is desirable, compact, portable recorders are available.

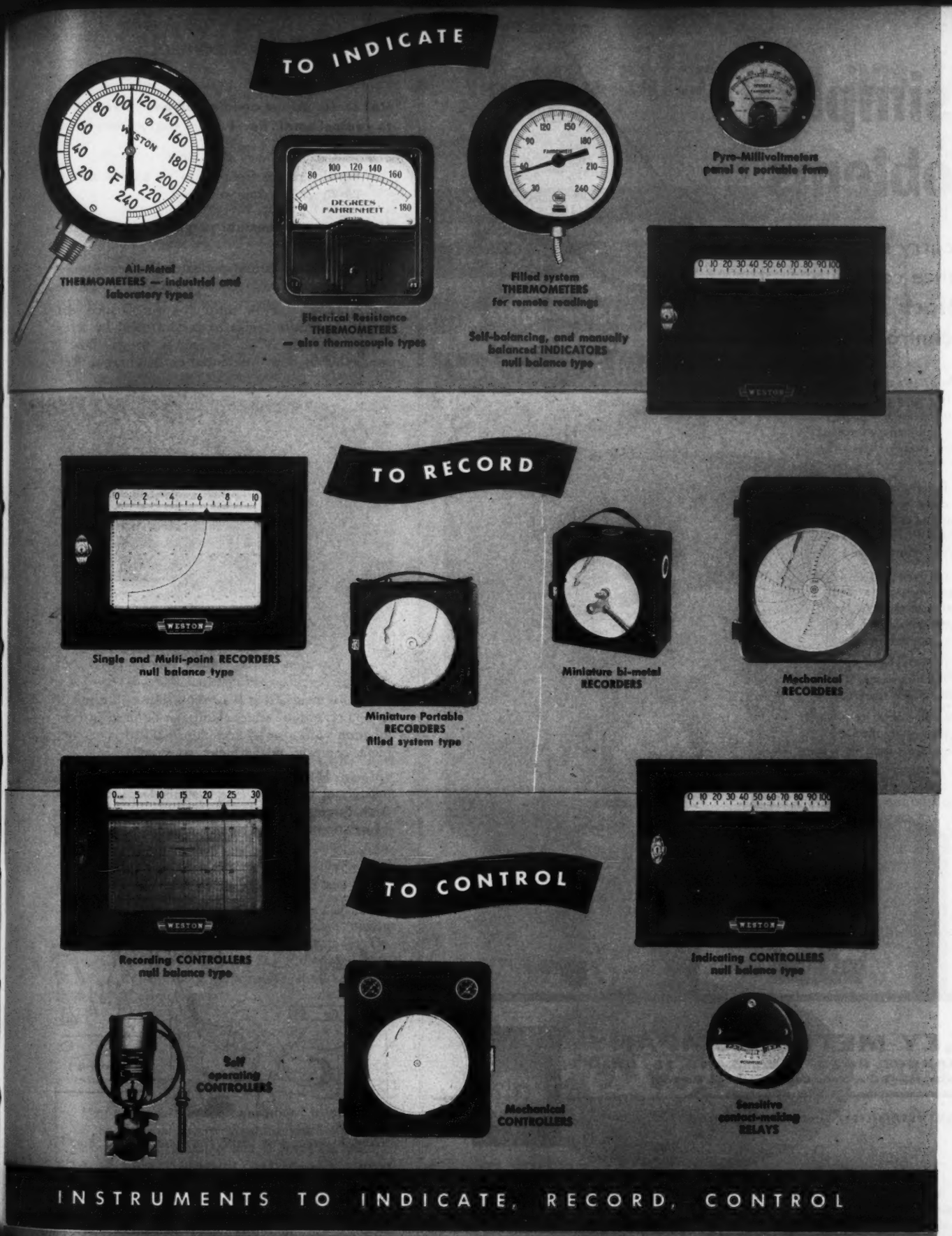
For control . . . there's a complete line of mechanical instruments — null-balance type instruments — as well as self operating controllers.

So remember . . . whenever you have a problem involving temperature measurement or control, the quickest, the surest solution requires no more than a phone call to your nearest WESTON representative. Literature on request. *Weston Electrical Instrument Corporation, 614 Frelinghuysen Avenue, Newark 5, New Jersey.* A subsidiary of Daystrom, Incorporated.



WESTON

HEADQUARTERS FOR TEMPERATURE


TO INDICATE
All-Metal THERMOMETERS — industrial and laboratory types
Electrical Resistance THERMOMETERS — also thermocouple types
Filled system THERMOMETERS for remote readings
Self-balancing, and manually balanced INDICATORS null balance type
Pyro-Millivoltmeters panel or portable form
TO RECORD
Single and Multi-point RECORDERS null balance type
Miniature Portable RECORDERS filled system type
Miniature bi-metal RECORDERS
Mechanical RECORDERS
TO CONTROL
Recording CONTROLLERS null balance type
Indicating CONTROLLERS null balance type
Self operating CONTROLLERS
Mechanical CONTROLLERS
Sensitive contact-making RELAYS
INSTRUMENTS TO INDICATE, RECORD, CONTROL

flow alarm and will use it to replace mercury switch and inductance coil models.

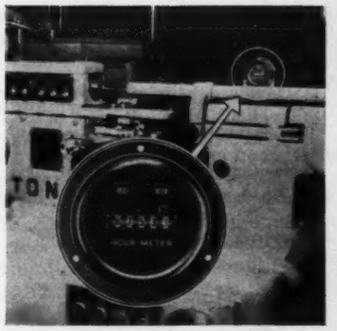
(F & P Ratolarm is product of Fischer & Porter Company, Dept. CP, 553 Jacksonville Road, Hatboro, Penna. Check 6971 on form opposite last page.)

Accumulates total time of machine use . . .

can be powered by AC used by machine

Uses: Accumulating operational machine time of plodders, extruders, presses, conveyors, packaging machines, any equipment powered by alternating current.

Features: Timers can be powered by same alternating current used by machine—120, 240, or 440 volts, 25, 50, or 60 cycles.



Hour meter shows operational use

Description: Timers can be either of two models, 10,000 or 100,000 hours. Instruments are small in size. Mechanism is completely enclosed and sealed against dust, moisture, and foreign matter. Instrument is powered by synchronous motor.

(AC timers are product of John W. Hobbs Corporation, Division of Stewart-Warner Corporation, Dept. CP, Springfield, Illinois. Check 6972 opposite last page.)

For more information on product at left, specify 6973 . . . see information request blank opposite last page.

How to simplify control problems

Keep systems flexible, carry small inventory, cut maintenance cost with the **Bailey Building Block Method** of instrumentation and control.

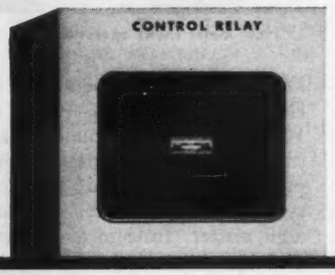
What is the Bailey Building Block Method? It's using standardized Bailey measuring, transmitting, and controlling components and combining them into any system you need. Components can be added as needed . . . removed and reused elsewhere . . . recombined into another system when the need changes. It's flexibility plus!

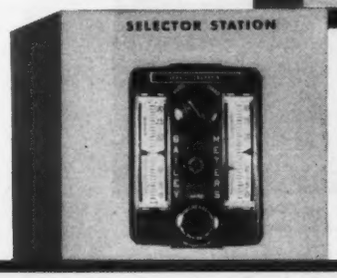
It's all based on the simple fact that a Bailey instrument or control component doesn't care if the measured variable is steam flow, tank level, or tower temperature, to pick just three examples. System components—transmitters, receivers, relays, selector stations, power units—are standardized for multi-purpose use.

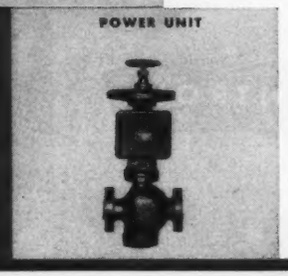
A spare component can be used in any one of many systems. Gone are delays waiting for shipments of special parts. Gone are large inventories of spares and parts. Simplified is the training of men for maintenance.

There are many exclusive features and advantages of the individual components used in the Bailey Building Block Method. And there's much more to the Building Block story itself.

For further details, call our local district office or write us at Cleveland. Our engineers will be glad to prove how the Building Block approach will save you money and simplify your instrument and control problems.







G36-1

BAILEY METER COMPANY
1074 IVANHOE ROAD, CLEVELAND 10, OHIO
In Canada—Bailey Meter Company Limited, Montreal

BAILEY BUILDING BLOCK METHOD

RESULTS IN: FLEXIBILITY, SIMPLICITY, ECONOMY

When inquiring check 6974 opposite last page

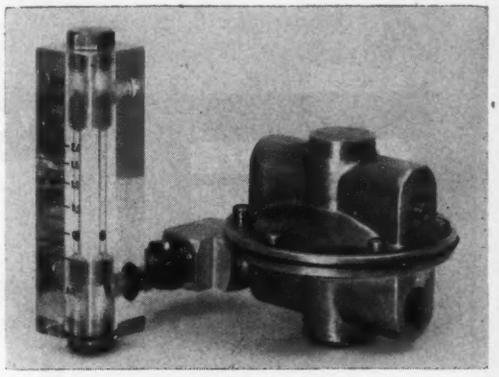
Has screw adjust needle valve to control small flows of air or water . . .

handles ranges from 0.2 to 2.0 scfh of air and 20 to 200 cc/min of water

Uses: For economical purging with air, water, or gas.

Features: Differential regulator has needle valve for blow regulation.

Description: Flow through spring-loaded, differential-pressure regulator is controlled by screw adjusted needle valve. Air, water, or gas flow is controlled by flow differential on diaphragm. Regulator has range from 0.2 to 2.0 scfh of air and 20 to 200 cc/min of water. Unit can be used in combination with a small flow rate indicator as a complete, compact, purge meter package.



Flow is controlled by screw head at right

(Model H-21F differential-pressure regulator is product of Conoflow Corporation, Dept. CP, 2100 Arch Street, Philadelphia 3, Pa. . . . or for more information check 6975 on form opposite last page.)

"Glad to meet you, Sir! I'm new around here!"

Thanks to Lester H. May, Jr., Union Oil Company of California, Rodeo, Calif.

Plots refractive index changes in stream output . . .

distinguishes between chemically similar substances

Uses: For qualitative and quantitative analysis of any non-opaque process stream as a still output or chromatographic eluate.

Features: Differential recording refractometer distinguishes between chemical substances and can be adapted to continuous stream monitoring.

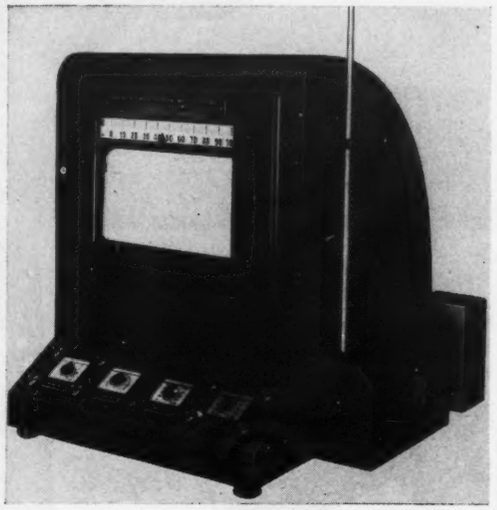


Chart movement is controlled by volume of sample

Description: Refractometer uses small glass differential cell with one ml solution to facilitate sharp fraction collections. Instrument is equipped with a variable monchromatic light source and operates at wavelengths 406, 436, 546, and 578 μ. Recorder pen indicates refractive index difference with chart movement being controlled by volume of sample passed. Instrument is null type with automatic standardization on both refractive and mass coordinates. Operation is on 115vAC.

(Automatic recording Differential Refractometer is product of Phoenix Precision Instrument Co., Dept. CP, 3805-05 N. Fifth St., Philadelphia 40, Pa. . . . or for more information check 6976 on form opposite last page.)

"Vapor Pressure of Nitroparaffins" is just one of the convenient nomographs you'll find in this month's Processing and Engineering Data Section beginning on page 174

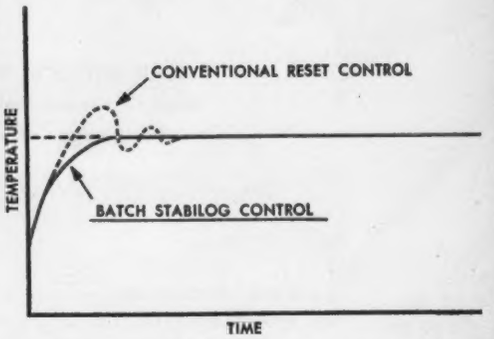
Faster, safer start-ups for Batch Processes

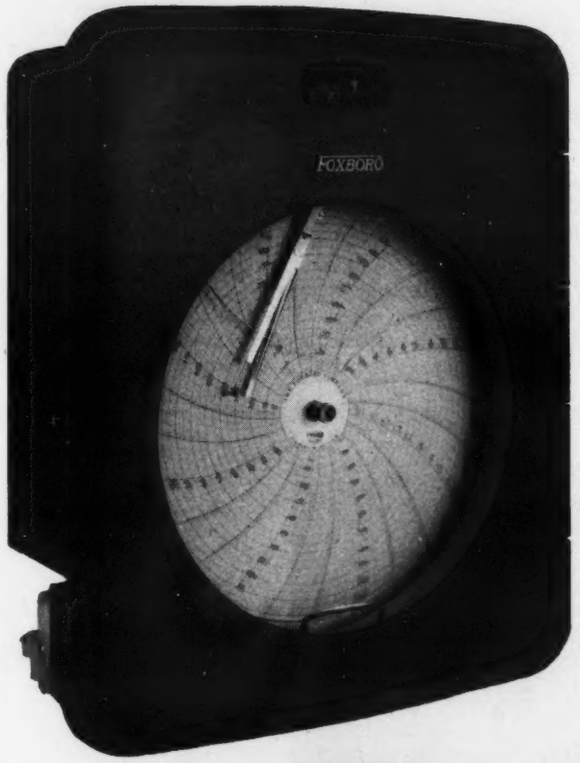
no overshoot

no spoilage

no undesirable side-chain reactions

no explosion hazards





That's right! You can get rid of costly, dangerous temperature "overshoot" problems in batch processing! The Foxboro Batching Controller solves them. This versatile Controller brings temperature up to control point fast . . . stops it "on the nose" . . . keeps it there throughout the holding period. What's more, this fast "no overshoot" control doesn't compromise *holding* control . . . settings are made separately, for optimum results in both periods.

Here's how the Controller works. It starts the operating cycle by feeding maximum heat to the batch . . . brings temperature up fast. At desired distance below control point, adjustable "braking" action automatically slows temperature rise . . . levels it off smoothly at the control point. Simultaneously, the "balancing" action begins . . . holds control point setting exact . . . restores it even when upsets occur. At shut-down of process, the Controller automatically resets itself . . . ready for another precise performance.

Send for information today. (For batch operations requiring *controlled rate of rise*, write for data on Foxboro Cam-Set and Time-Cycle Controllers.)
The Foxboro Company, 818 Norfolk Street, Foxboro, Mass., U.S.A.

FACTORIES IN THE UNITED STATES, CANADA, AND ENGLAND

FOXBORO
REG. U.S. PAT. OFF.

CREATIVE INSTRUMENTATION for Process Automation

When inquiring check 6977 opposite last page

HCl, CCl_4, AND Cl_2 not too tough for glass piping

High quality of Hercules chlorinated rubber maintained with corrosion-resistant piping which offers the additional advantages of visibility, lightness, low friction losses, and weatherability

GORDON WEYERMULLER, Associate Editor
With **PAUL E. GRAYBEAL,** Operating Supervisor
Chlorinated Products Department
Hercules Powder Company, Parlin, N.J.

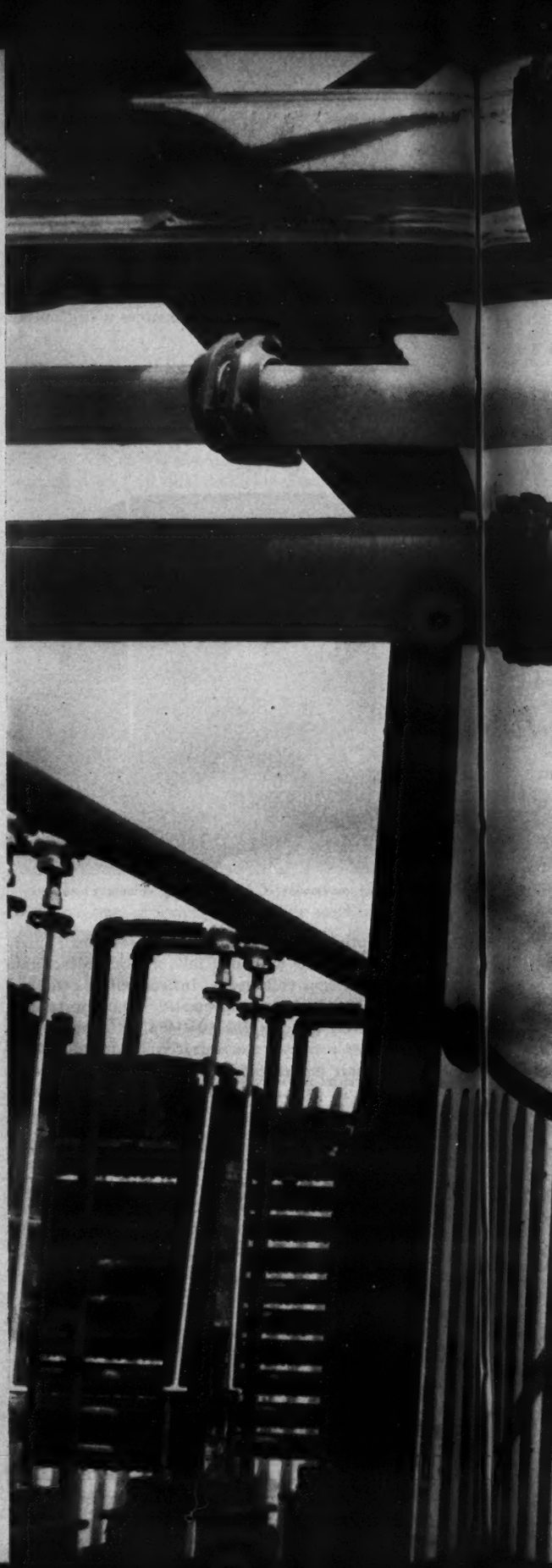
Problem: Non-metallic piping used for carrying hydrochloric acid, carbon tetrachloride, and chlorine at the Parlin, New Jersey, plant of Hercules Powder Company, was heavy and required considerable support. In addition, this material was of uneven quality and too bulky for ideal alignment.

Piping made from various corrosion-resistant alloys was tried. This metallic piping solved the problems of weight and alignment to a considerable extent, but deteriorated under the flow of corrosives. This resulted in possible contamination of product and danger of gas leaks into atmosphere. Since chlorine is a heavy gas, detectable by odor in parts as low as 3 or 4 ppm, a small leak is irritating to personnel in area. Shutdowns made to find these leaks and make repairs caused production delays.

In the area where the corrosive fluids are used, Parlon* (chlorinated rubber) is manufactured. After preliminary treatment, rubber is then dissolved in carbon tetrachloride. Resultant solution is piped to chlorinators, where chlorine is added. This solution is filtered and sent to precipitators. Product leaving precipitators as pellets in a slurry is further purified

(*Please turn to page* 88)

Paul Grayboal, Operating Supervisor, points to four-inch glass line carrying hydrochloric acid containing dissolved carbon tetrachloride and chlorine



Photograph taken on roof of Parlon plant shows both clear and armored glass piping

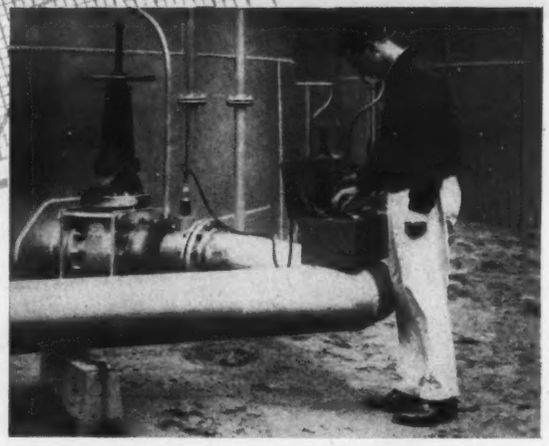
KNOW YOUR CORROSION RATES!

WITH THE CORROSOMETER

- DIRECT READINGS
- MICRO-INCH SENSITIVITY
- PROBES OF 20 ALLOYS
- FOR ALL CORROSIVE SYSTEMS

Quick, Convenient, Accurate. Now you can measure progress of corrosion at any location in your system or plant without need for handling test coupons, taking samples or disturbing plant operations! The CORROSOMETER system consists of any number of probes, which remain in continuous service and a meter which plugs into each probe to indicate extent of corrosion directly in micro-inches of metal lost. Probes are available to meet various processing requirements in Chemical Processing — Buried and Submerged Structures — Laboratory Testing — Petroleum Production and Refining — Food Plants, and other Industrial Applications.

WRITE NOW FOR FURTHER DETAILS



CREST INSTRUMENT COMPANY • 11808 S. BLOOMFIELD • SANTA FE SPRINGS, CALIFORNIA

When inquiring check 6978 opposite last page

conax®

PACKING GLANDS

USING "SOFT" SEALANTS

UNIVERSAL

Any bore size available from 1/16" to ¾" diameter

CONAX Packing Glands compress the "soft" sealant against any kind of tube, rod or wire with the following advantages:

- Temperature range: −300°F to +1850°F.
- Pressure range: vacuum to 7500 psi.
- Non-destructive to sealed element
- Completely adjustable immersion
- Stainless steel construction
- Available "soft" sealants: Neoprene, Teflon, Lava and Asbestos-Graphite
- Delivery from stock

WRITE FOR CONAX DATA BOOK SHOWING COMPLETE LINE OF THERMOCOUPLE ASSEMBLIES AND PRESSURE SEALING GLANDS.

conax corporation
7817 Sheridan Drive, Buffalo 21, N. Y.

When inquiring check 6979 opposite last page

STAPCO STAINLESS

STAINLESS STEEL HIGH PRESSURE JACKETED TANKS

FAST-FLOW high pressure jacketed tanks, for heating and cooling in processing, are of exclusive STAPCO design and permit use of lighter tank walls giving a maximum of heat transfer.

MODEL "JCV"

STAINLESS PRODUCTS CORPORATION

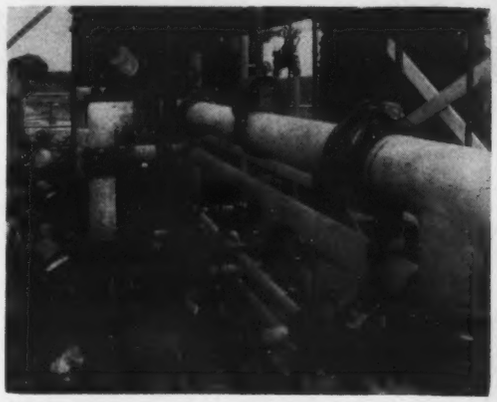
BELDING — MICHIGAN

STAPCO STAINLESS

When inquiring check 6980 opposite last page

Glass Piping

(*Continued from page* 86)



Armored glass piping gives added protection to personnel in certain locations and is a further guarantee against a complete break at any time

and dried. After a trip to the blending bins, finished Parlon is ready to package and market.

Finding a satisfactory piping to carry the highly corrosive products handled in the various Parlon processing stages presented a serious and difficult problem.

Solution: In 1949 after investigation and testing, it was concluded that Pyrex-brand glass piping was superior to any other on the market for this particular application. Accordingly, in 1950 and 1951 a complete system of glass piping was installed in the Parlon plant — in diameters of 1, 2, 3, 4, and 6″. Proportion between inside and outside piping is about 50/50.

Glass piping carries the tetrachloride solution of dissolved rubber to the chlorinators, and from there to the precipitators. Resultant gases are carried by the glass piping through condensers for reuse in liquid form. Glass pipe is also used to convey the dried, flaked completed Parlon to the blending bins, thus protecting the product from metal contamination. Hence, glass pipe is used in every stage of manufacture and byproduct recovery.

Materials passing through the piping vary in temperature from 0 to 100°C. Most sudden temperature change to which piping is subjected is from 20 to 100°C within less than two minutes. Piping of 2″ diameter is subjected to 20-30 psi pressure and pipe of other diameters to 5 psi.

Additional glass piping was installed recently with a 50% expansion of Parlon plant facilities. At present, 2300′ of the glass piping is being used. A portion of this glass pipe is armored for added protection to personnel in certain locations. Armored glass pipe is a further guarantee against a complete break occurring at any time. It also protects pipe from dropped tools and other possible

damage. Armor consists of a 1/16" thick seamless sleeve of Fiberglas, fitted over the pipe and impregnated with polyester.

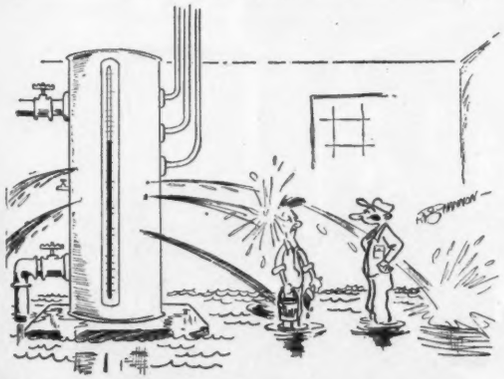
Results: In the several years since the first installation of glass piping at the plant, it has become the accepted piping for use in the chlorinated products area for most applications involving handling of highly corrosive materials, either in liquid or gaseous form. Exposure of the entire outside system to the varying weather conditions of New Jersey has not affected the glass piping.

Since the glass is completely inert to the corrosives being handled, possibility of product contamination by the glass does not exist. Avoidance of metallic contamination contributes greatly to the high quality of the protective coatings, lacquers, adhesives, and other products in which the Parlon is used.

Visibility of the clear glass piping enables operators to check the flow continuously for bubbles, cloudiness, the presence of liquids when gases are normally to be expected, and other abnormalities. Armored glass pipe is translucent and that is all the visibility needed in many instances. In a number of sections, small strips of armor have been peeled — to provide clear visibility without materially affecting the safety factor.

Lightness of the glass piping makes it easy to handle and support. Most pipe is factory-fabricated. However, in diameters up to three inches, the plant field-fabricates odd lengths.

(Pyrex-brand glass piping is product of Corning Glass Works, Dept. CP, Corning, N. Y. . . . or for more information check 6981 opposite last page.)



"Something tells me it's beyond the 'corrosive-resisting coating stage', Barnwell!"

Credit for this cartoon goes to Ray Shannon of the Nitrous Oxide Dept., Medical Gas Div., Thomas A. Edison, Incorporated, Stuyvesant Falls, N. Y.

better protection against corrosion!

Corrosion of metals, the age-old problem of paint chemists, is getting a real going over with "wash primers" based on Shawinigan Resins' FORMVAR and BUTVAR . . . polyvinyl formal and butyral resins.

These anti-corrosive primers, sometimes referred to as metal conditioners, apply easier, adhere better, dry faster than more conventional materials. In addition, they assure a better foundation for paint systems while preventing underfilm corrosion. Wash primers prevent corrosion in a threefold protective action. First, an inorganic phosphate film is formed at room temperature rather than in the usual hot bath; second, the primers provide a steady stream of chromate ions to fill any pin holes in the film; finally, a tanned polymeric acetal film which provides outstanding mechanical protection forms over the phosphate film. All this is accomplished in one operation.

The wash primer protective coating of only 0.3 to 0.8 mil thickness, is a tough, corrosion resistant conditioner for steel, aluminum, cadmium, tin, galvanized iron and magnesium. Formulation of a system is easy in your regular ball or pebble mill.

The use of "wash primers" has extended the life of metals in many applications and has opened profitable new markets for paint manufacturers. For full technical information, resin samples and suggested formulations, write Shawinigan Resins Corporation, Department 1308, Springfield 1, Massachusetts.

FORMVAR® and BUTVAR® resins by

SHAWINIGAN RESINS

When inquiring check 6982 opposite last page

Want to forget about rust for 20 years?

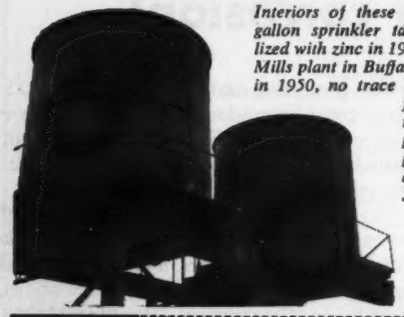
Pure zinc or aluminum, molten-sprayed on iron or steel surfaces, provides positive, dependable protection against atmospheric corrosion for upwards of 20 years without *any* further maintenance.

These unique coatings are *mechanically* bonded to the surface—adhesion is *not* dependent on volatile vehicles or binders. Scaling, crazing, blisters are eliminated. Protection is *positive*. "Metallize 'em and forget 'em!"

Why not find out more about how you can forget about rust on iron and steel structures and equipment—eliminate the nuisance and expense of constant painting and repainting? Write for descriptive Bulletin 62-B—it's free.

the Metco Systems*

—a series of 18 basic engineering specifications developed over 19 years of experience with pure zinc and aluminum coatings on many different types of structures and equipment in a wide range of corrosive conditions. The *Metco Systems* provide for standardization of surface preparation, coating thicknesses and organic aftercoatings for various surface conditions and appearance requirements.



Interiors of these two steel 15,000 gallon sprinkler tanks were metallized with zinc in 1934 at the General Mills plant in Buffalo. Last inspected in 1950, no trace of rust could be found, and zinc remaining is expected to provide protection for an additional 15 to 20 years.

Metallizing Engineering Co., Inc.
1143 Prospect Ave., Westbury, L. I., New York · cable: METCO
In Great Britain:
METALLIZING EQUIPMENT COMPANY, LTD.—Chobham near Woking, England

DON A. WATSON METALLIZING ENGINEERING CO., INC.
1143 Prospect Ave., Westbury, Long Island, N. Y.

☐ Please send me, without obligation, Bulletin 62-B.
☐ Please have Metco Field Engineer call.

NAME_____
COMPANY_____
STREET_____
CITY_____ ZONE_____ STATE_____

When inquiring check 6983 opposite last page

In production of synthetic resins, where small amounts of contaminants would cause loss of desirable properties, Schenectady Varnish Co. . . .

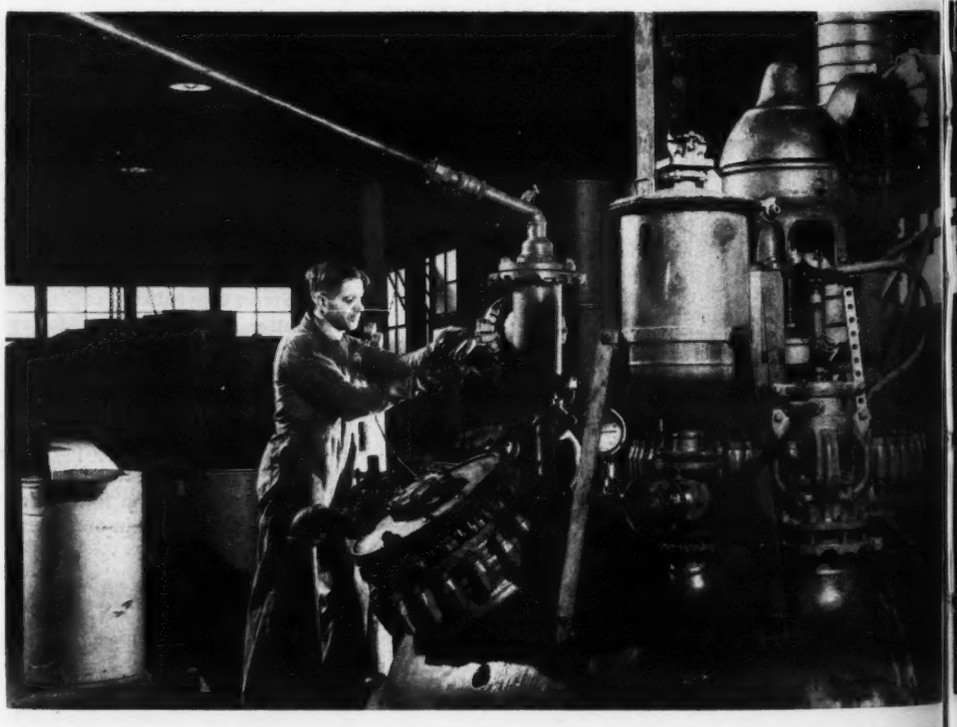
Protects resin purity with glassed steel

Problem: Only a slight amount of impurities, a few parts per million, could spoil an entire batch of synthetic resin at Schenectady Varnish Co.'s, Rotterdam Junction Plant. Resins, particularly terpenes, are extremely sensitive to metal contamination. In addition, close control of temperature, amount of catalyst present, and agitation are critical. Any contamination could cause lower dielectric qualities, poor color, and reduced shelf-life. For these reasons processing equipment was required that could not possibly be a source of contamination.

Company produces many forms of water- and oil-soluble resins, both heat reactive and non-heat reactive. Of these, terpenes are used in food packaging, household medical tapes, and cellophane tapes to improve shelf-life of adhesives; maleics and alkyds for paint trade; styrenes for plastics; resorcinols for rubber industry; and high-grade phenolics for laminating.

Solution: Late in 1955, Schenectady Varnish installed a glass-coated steel reactor for synthetic-resin processing. A 1/16" coating of glass, completely covering inside of kettle, is applied as a water suspension and baked in an oven at temperatures up to 1700°F. Product comes in contact only with glass.

Reactor is equipped with a two-speed, 15-hp explosion-proof motor. Range of agitator speeds from 25 to 150 rpm is possible by switching motor



pinions. An impeller agitator with a three blade upward-deflecting baffle is used. Bottom outlet is offset from center, permitting agitator to sweep settling material clear.

Unit is rated for temperatures to 350°F with internal pressures from full vacuum to 100 psi, coincident with 90-psi jacket pressure.

Results: Glassed-steel construction is fully resistant to all acids except hydrofluoric and alkalis to pH 12 at temperatures up to 212°F. Reactor has been turning out 10,000 lb of resin per day, seven days a week, for more than six months. Since unit completely resists corrosion there is no possibility of metal contamination of resin batches. Nonadherence of glass lining and product speeds and simplifies cleaning operations. There is less downtime during changeover from one product to another. Even small amount of waste that could result from incomplete washdown of product is avoided.

Adjustments of temperature, catalyst addition, and agitation can be made immediately without complicated mechanical procedures. Resins produced are uniformly good in color, possess desired dielectric properties, and show completely satisfactory shelf-life.

(Glass-coated steel reactor is a product of The Pfaudler Co., Dept. CP, Rochester, N. Y. . . . or for more information check 6984 on form opposite last page.)

Charging solvent into glass-coated steel reactor used in synthetic resin production at Schenectady Varnish Co.

New TARSET Licks Tough Chemical Corrosion Problems—Economically!

For the economical control of corrosion in tough spots like the acid bath shown above, new Pitt Chem *Tarset* has no competition! No other protective coating on the market today offers you the broad corrosion-resisting properties and relative low cost of this unique coal tar-epoxy resin coating.

***Tarset* offers unusual resistance to most acids, alkalis and salts. It is especially recommended for the protection of storage tanks, precipitator tanks, bulk material conveyors and similar equipment where corrosive conditions are severe.**

***Tarset* does not shatter or loosen when subject to extreme impact tests. And it actually becomes *harder* at elevated temperatures! It can be applied by spray, brush, or roller.**

***What can Tarset do for you?* If you have a stubborn corrosion problem that must be solved within a definite maintenance budget, Pitt Chem *Tarset* may be your answer. We'll be glad to send you complete technical data and samples for testing.**

Send for Descriptive Booklet on TARSET today

Free booklet tells how to use amazing new Tarset to reduce costly corrosion. Gives detailed description of Tarset's specifications, properties and application characteristics. Write for your copy today!

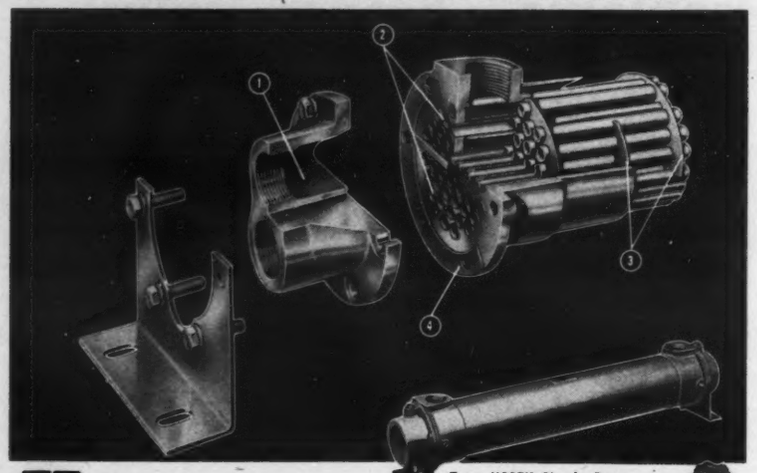
PITTSBURGH COKE & CHEMICAL CO.

WSW 6177

COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

When inquiring check 6985 opposite last page

Young Engineering Talent
Solves Corrosion Problems



Type "SSF" Single Pass

Type "SSF" Multipass

Young Stainless Steel heat exchangers provide more cooling surface per unit volume

The problem: Meet the Chemical Industry's need for corrosion-resistant heat exchangers.

How Young solved it

After months of testing, Young Radiator Company utilized a special type of stainless steel for fabricating heat exchangers. They are for use in the processing of highly corrosive chemical liquids and gases. The newer Young Exchangers are engineered to withstand expansion strains and have reserve capacity. They include factors for fouling, and simplified construction makes cleaning easy.

1 Smooth flow bonnet distributes fluid with minimum turbulence to tubes.

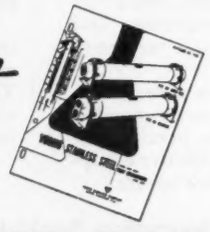
2 Tubes are rolled into headers.

3 Baffles made to close tolerance.

4 Gasket eliminates by-passing, fluid leakage.

Put Young Talent to work for you . . .

Solving heat transfer problems is what we do best because it is our very reason for being. You, too, can harness the power of Young engineering talent. Write, wire or call without obligation.



Write Dept. 376-H for Free Catalog.

Young RADIATOR COMPANY

RACINE, WISCONSIN

Creative HEAT TRANSFER ENGINEERS FOR INDUSTRY

Heat Transfer Products for Automotive, Aviation and Industrial Applications. Heating, Cooling, Air Conditioning Products for Home and Industry.

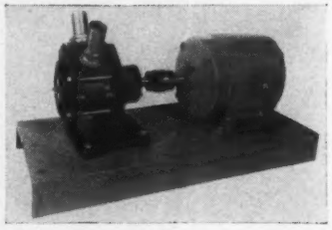
Executive Office: Racine, Wisconsin. Plants at Racine, Wisconsin, Mattoon, Illinois

When inquiring check 6986 opposite last page

Capacities to 20 gpm offered in pump . . .

stainless unit can handle many corrosives

Stainless steel pump previously available in 1/3- to 5-gpm capacities is now offered in 10- to 20-gpm capacities also with pressure ratings of 0 to 50 psi. Units incorporate the basic features of the "flex-i-liner" design which eliminates need for stuffing boxes or shaft seals.



Corrosion-resistant pump

(Series XB Flex-Alloy pumps are product of Vanton Pump & Equipment Corp., Div. Cooper Alloy Corp., Dept. CP, 201 Sweetland Ave., Hillside, N. J. . . . or for more information check 6987 on form opposite last page.)

"HEY JOE, THEY FINALLY GOT THE NEW AIR COMPRESSOR RUNNING!"

Another cartoon from Tom Sarvay of Diamond Alkali's Research Center.

A type for every purpose

Glass-clear transparency, flexibility and resistance to corrosion make Tygon Tubing the ideal piping medium for a wide range of applications . . . handling fluids, semi-solids, gases, vacuums or pressures.

Where pressure is a factor, outer braid reinforced Tygon Tubing will handle up to 300 psi. Heavy walled Tygon will handle full vacuums.

Tygon Tubing is resistant to acids, alkalies, oils, water and alcohol. It is non-toxic, non-contaminating, will handle foods, drugs and other high purity products. Standard sizes range from 1/16" i.d. to 2" i.d.

WRITE TODAY FOR BULLETIN T-87

Plastics and Synthetics Division

U. S. STONEWARE

AKRON 9, OHIO

204E

When inquiring check 6988 opposite last page

DARCOVA PUMCUPS

now available with

100% NYLON COMPOSITION

for HYDRAULIC CONTROLS, AIR CYLINDERS, RECIPROCATING PUMPS

Darcova Pumcup

DARCOVA PUMCUPS—long noted for unequalled efficiency and life in all kinds of cylinders—are now greatly exceeding their own performance records! The new 100% Nylon Composition, available *only* in Darcova Pumcups, does it!

Nylon Pumcups are made in sizes, types and textures exactly right for your particular equipment—ready *now* to give you unprecedented piston packing performance!

Write for helpful data Bulletin No. 5503.

Darcova 45° Bevel Type Pumcup

DARLING VALVE & MANUFACTURING CO.

Williamsport 4, Pa.

DARCOVA

TRADE MARK

PUMCUPS

When inquiring check 6989 opposite last page

Treatment on one or both sides permits Teflon sheets to be bonded . . .

can be cemented to steel, aluminum, wood, plastics, and other materials

Uses: For parts that encounter wear or corrosive conditions such as liners for tanks, pipe, ducts, and valve facings.

Features: Sheets and tape are specially treated on one or both sides to allow cementing to a variety of materials or to itself. Tensile strength of bondized Teflon and aluminum is 600-650 psi, while peel strength is 35-40 lb/in.

Description: Bondized sheets and tape can be cemented to steel, aluminum, wood, plastics, rubber, and other materials. Tape is available, treated

Bondized Teflon has high tensile and peel strength

on one or both sides, in thicknesses ranging from .005 to .125", up to 24" in width. Sheet is available in thicknesses from 1/32 to 1½" in 12 x 12" standard sheet sizes.

(Kelon-T sheets and tape are products of Shamban Engineering Co., Dept. CP, 11617 W. Jefferson Blvd., Culver City, Calif. . . . or for more information check 6990 on the convenient Reader Service slip which is located opposite last page.)

Nickel and nickel-alloy tubing discussed in 20 pages

Handbook has 20 pages of valuable information on nickel and nickel-alloy tubing. In addition to giving information on company's small diameter tubing, specific mechanical properties and chemical compositions of 13 types of nickel and nickel-alloy tubing are included. Six-page section describes characteristics of each type and gives typical applications.

Cat 12 is issued by Superior Tube Co., Dept. CP, 1512 Germantown Ave., Norristown, Pa. When inquiring specify 6991 on form which is located opposite last page.

TRI-CLOVER

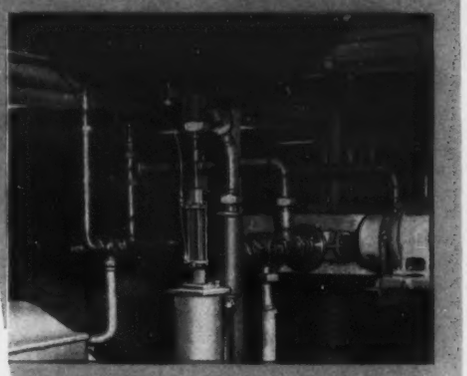
Stainless Steel Fittings help control quality at A. B. DICK COMPANY plant

A. B. DICK® is a name known for highest quality duplicating machines, folding machines, and impression paper. At their ultra-modern plant in Chicago, this progressive company makes certain that their reputation for quality is protected in all phases of operation.

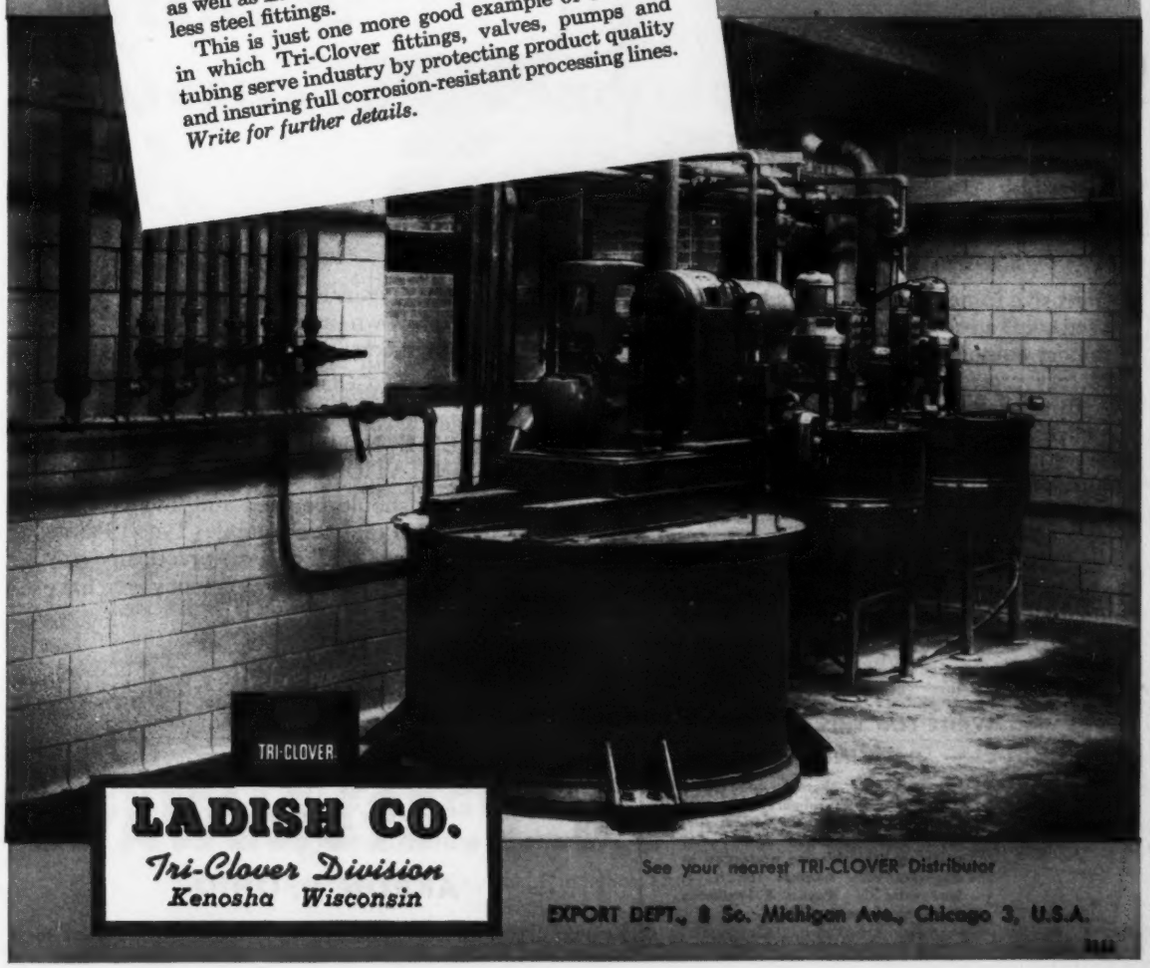
In making aqueous base clay paper coatings, for example, A. B. DICK Company makes extensive use of Tri-Clover Division's sanitary type stainless steel fittings, compression valves, and plug valves, as well as Ladish Co. tube O.D. butt welding stainless steel fittings.

This is just one more good example of the way in which Tri-Clover fittings, valves, pumps and tubing serve industry by protecting product quality and insuring full corrosion-resistant processing lines.

Write for further details.



Shown below is the mixing room where aqueous base clay paper coating is prepared, using Tri-Clover fittings and valves. The view above is a close-up taken from underneath the coating mixer, showing Tri-Clover fittings, compression valves, plug valves and air-actuated kettle valve.



LADISH CO.

Tri-Clover Division

Kenosha Wisconsin

See your nearest TRI-CLOVER Distributor

EXPORT DEPT., 8 So. Michigan Ave., Chicago 3, U.S.A.

When inquiring check 6992 opposite last page

ARE YOU

PAINTING WITH APPLESAUCE?

Corrosive fumes and gases play havoc with "unprotected" structural steel or concrete walls and factory equipment. But the selection of a satisfactory protective coating isn't always easy. A coating that adequately protects against fume "A" may fail in a week against fume "B."

Corrosion engineers know there is no "all purpose" protective coating. Wisely they steer clear of products whose makers claim universal "acid and alkali" resistance. They have learned through bitter experience that all too frequently they end up "painting with applesauce."

The fact that Tygon Paints—first marketed in 1939—have grown increasingly popular with corrosion engineers, stems from two things:

1. They are GOOD PROTECTIVE COATINGS

2. WE'RE NOT AFRAID TO ADMIT THEIR LIMITATIONS

Used as they should be used and under conditions for which they are suitable, Tygon Paints will out-perform and outlast practically any coating on the market. Seventeen years have proved it.

323E

WRITE FOR THIS FREE
PAINTING MANUAL

Tells how and where to use Tygon Paint . . . what primers to use to obtain best adhesion to various surfaces; how to make sure you're going to get adequate protection at minimum cost. Address The U. S. Stoneware Co., Plastics & Synthetics Division, Akron 9, Ohio.

Plastics & Synthetics Division

U. S. STONEWARE

AKRON 9, OHIO

When inquiring check 6993 opposite last page

Stauffer stops corrosion with plastisol coatings on agitators

Equipment is used for mixing abrasive slurries of organic chemicals

Problem: At Stauffer Chemical Company, Brooklyn, N.Y., in one production step, an abrasive and corrosive chemical crystallizes from an agitated slurry, necessitating protection of equipment from rapid wear. Stauffer contracted with Paterson Rubber Co., Paterson, N.J. to cut and

Vinyl plastisol coating on agitator withstands corrosive and erosive conditions

cement soft rubber strips on the curved surfaces of agitators used in this process. Rubber proved far from satisfactory, however. Some of rubber strips were eroded by the sand-like crystals after only a few months service.

Solution: Vinyl plastisols gained Stauffer's attention as possibly possessing longer life under the conditions imposed by this particular application. Paterson Rubber was enthusiastic, since dipping agitators in plastisol and then curing was a much less time-consuming operation than cutting and fitting the rubber strips. Tests were worked out to evaluate the possible use of plastisols.

In first test, a small plastisol patch was weighed and then attached to an agitator in service. After four months, the patch was removed and reweighed. No weight loss had occurred. After that, an entire agitator was coated with the vinyl plastisol and placed in service.

Results: After eight months of mixing the

tough, abrasive slurry, plastisol coating is still as good as new. As a result, Stauffer has ordered plastisol coatings for all of its remaining agitators, as well as for the covers and drain plugs of tanks containing the slurries.

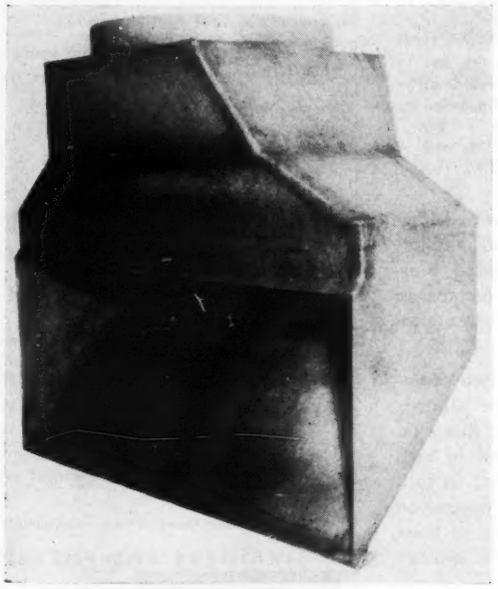
(Unichrome vinyl plastisol coatings are product of Metal & Thermit Corp., Dept. CP, Rahway, N.J. . . . or for more information about manufacturer's product, reader may simply check 6994 on form which is located opposite last page.)

High resistance to HCl among advantages of fume hood . . .

polyester-glass unit is light in weight, has high impact strength

Uses: For industrial fume removal applications.

Features: Hood has high resistance to hydrochloric acid and other fumes normally corrosive to conventional materials. Unit is light in weight and has high impact strength.

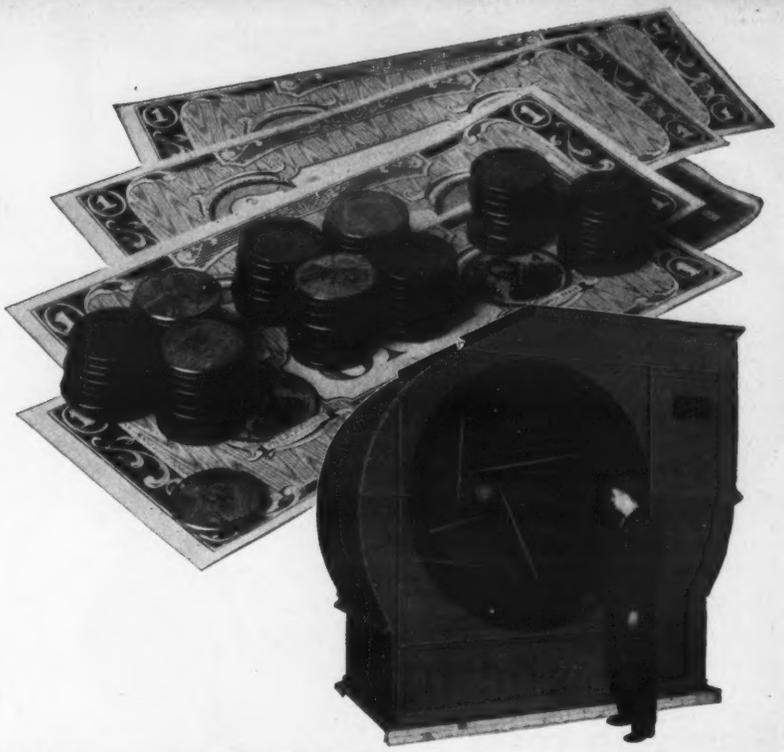


Corrosion-resistant fume hood

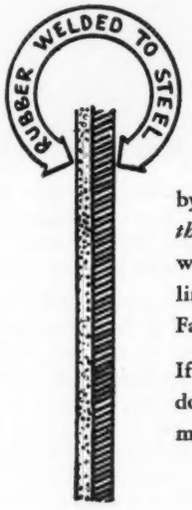
Description: Fume hood is fabricated from polyester resin, reinforced with glass. It is available as standard unit or can be custom built. Ease of field fabrication makes it possible to change hood where desired.

(Fume hood is product of Haveg Industries, Inc., Dept. CP, 900 Greenbank Rd., Wilmington, Del. . . . or for more information check 6995 on the convenient Reader Service slip which is located opposite last page.)

$AVE UP TO 91c of every $1.



INVESTED IN CORROSIVE FUME HANDLING



SEE HOW "BUFFALO" RUBBER-LINED EXHAUSTERS ARE DOING IT IN HUNDREDS OF PLANTS

Fumes from many processes destroy ordinary steel plate exhausters far earlier than normal life expectancy — and fan replacement is a major expense.

"Buffalo" Rubber-Lined Fans save you this expense. All exposed parts are protected by a layer of rubber "welded" permanently to the steel. *Corrosive fumes cannot contact the metal.* Small wonder these fans have stood up under the severest fume services anywhere from 3 to 12 times longer! Savings far more than pay for the cost of the rubber lining, to say nothing of reduction in down-time. It's just one more example of the "Q" Factor* that saves you money in all "Buffalo" Fans.

If you have fume exhausting installations, it will pay you to check fan replacement and down-time costs, and see how "Buffalo" Rubber-Lined Exhausters could be saving you money.

WRITE FOR BULLETIN 2424-F TODAY!

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

BUFFALO FORGE COMPANY
BUFFALO, NEW YORK
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo"

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING

When inquiring check 6996 opposite last page

Pumping costs stay down with

AMPCO* Centrifugal Pumps

. . . because they adapt easily to changing conditions and demand, resist corrosion and erosion, save power

When you buy an Ampco Pump, you're making an investment in years of low-cost pumping. You get a pump made from Ampco Metal — or any other workable alloy you need — to withstand corrosion and erosion in *your process*.

You get a well-designed pump with unusually stable characteristics — one that can handle wide variations in demand without chattering and pounding, or causing excessive wear on piping or valves. You get a high-efficiency unit that saves power — reductions of 25% to 60% in power requirements are not unusual with Ampco Pumps on the job.

Better still, you get an off-the-shelf pump that can be equipped more than 108 different ways to meet your requirements. For example, you select your shaft from standard, heavy, extra-rigid, or two-piece types. Bearings are prepacked, replenishable-grease or oil-lubricated, single or double width, as you wish. You choose shaft seals, impeller types, and pedestal heights — all with the same basic pump.

And get this! If your pumping conditions change, you can adapt this pump in the field, quickly and inexpensively.

Keep your pumping costs at an all time low with Ampco Centrifugal Pumps. Speeds, 1750 and 3500 rpm. Capacities to 600 gpm, head to 300 feet. Write for literature.

*Reg. U. S. Pat. Off.

AMPCO

Sole producer of genuine Ampco Metal

AMPCO METAL, INC.
Dept. CP-8, Milwaukee 46, Wisconsin

West Coast Plant
Burbank, California

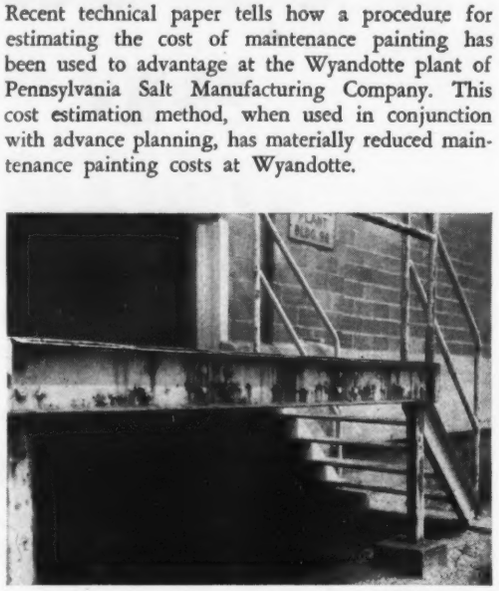
P-20

When inquiring check 6997 opposite last page

Engineering approach to cost of maintenance painting . . .

procedure used with planning reduces costs at Pennsylvania Salt

Recent technical paper tells how a procedure for estimating the cost of maintenance painting has been used to advantage at the Wyandotte plant of Pennsylvania Salt Manufacturing Company. This cost estimation method, when used in conjunction with advance planning, has materially reduced maintenance painting costs at Wyandotte.



In estimating maintenance paint costs for this job, surface shows moderate blisters and rust, so a factor of 1.00 is used for this condition. Surface configuration presents added difficulties so factor for this is 2.00. Posture factor is 1.30 since stooping, kneeling, and sitting are required for most all of painting

Previous to present program, survey showed that painting jobs scheduled for small, local applications were excessively costly. Now painting projects are anticipated and scheduled six months in advance. Small jobs are combined into more productive large scale painting operations.

Estimation of painting costs consists of two operations: calculating the square footage to be painted; and estimating the cost per sq ft to paint this area. A reliable procedure must be worked out in each plant for estimating the area to be painted in each project. Cost per sq ft has been found to depend on each of the following conditions. Any one of these can increase costs, depending on specific circumstances.

1—Paint material
2—Application procedure
3—Surface condition
4—Pretreatment
5—Surface configuration
6—Rigging
7—Interference
8—Environment
9—Posture

For estimation purposes, an average base of painter manhour productivity is first established. After this base is established, adjustments are made for variations from ideal for each of the nine conditions listed by multiplying by a factor. Under ideal conditions, factor would be 1.00 for each of the nine items. Factors have been determined for specific

STOP NEEDLESS WASTE OF CORROSION

in Woven Wire Screens

Yes, you can stop needless waste in **YOUR** plant when you specify **CLEVELAND** Wire Screens for your next installation.

Available in all corrosion-resistant metals and alloys, such as:

Stainless Steel
Monel
Nickel
Silver
Copper Alloys

CLEVELAND WIRE SCREENS

CLEVELAND Wire Screens are designed for longer life and better service.

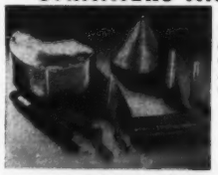
Woven to individual specifications for every purpose in any size or dimension, such as Vibrating Screen Sections, Filter Elements, Strainer Elements, Centrifuges.

WE CUSTOM BUILD

Filter Segments and Strainer Elements to your individual needs . . . in all commercial metals and alloys.

Easy to order—send us your requirements!

STRAINERS AND FILTERS



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Custom-built and adapted to individual needs. Available in all commercial metals and alloys.

Write for Bulletin 6, 7, and 8

The CLEVELAND WIRE CLOTH & MFG. Co.
3578 E. 79th Street
Cleveland 5, Ohio

When inquiring check 6998 opposite last page

variations from each of nine conditions so that a difficult job can be accurately estimated.

In the past three years at Wyandotte, labor for painting has been reduced from six to four man hours per 100 sq ft, the base under ideal conditions. This improvement is attributable in large part to increased efficiencies developed by paint crew due to instruction in and application of the educational program.

(Condensed from technical paper, "An Engineering Approach to the Estimating of Maintenance Painting," by R. F. Williams and J. H. Cogshall, Pennsylvania Salt Manufacturing Co. Paper was presented at the 1956 Annual Meeting of the National Association of Corrosion Engineers in New York City.)

Redesigned glass-lined valves, fittings, and pipe

Twelve-page bulletin illustrates and gives sizes of redesigned glass-lined valves, fittings, and pipe. Availability of high-pressure valves is announced, with service up to 300 psi. Recently developed spray-ring attachment for valves swirls water around seat, flushing sediment away.

Bul 886 is issued by The Pfaudler Co., Dept. CP, 1010 West Ave., Rochester, N. Y. When inquiring specify 6999 on form opposite last page.

Koroseal pipe carries corrosive solution powerful enough to etch steel

THIS paper mill speeded up flow of corrosive sodium hypochlorite bleach to its pulp beaters by installing high impact rigid Koroseal pipe lines This modern anti corrosive system eliminates a time-consuming hand measuring operation. Perhaps the corrosion problems you have can also be solved by B. F. Goodrich high impact PVC pipe. In addition to handling corrosives safely, Koroseal pipe has the strength to take a beating.

Koroseal pipe is unaffected by most acids and alkalies as well as oil, water, alcohol and salt solutions. Many solutions that eat away metal piping can be safely carried by Koroseal.

Easy to use with Koroseal fittings and valves, this rigid pipe can be threaded on any standard pipe threading equipment.

Koroseal pipe is available in various pressure schedules. Koroseal PVC comes in pipe, tubing, fittings, valves, rod, sheet and custom extrusions.

For full information on rigid Koroseal products fill in the handy coupon. Distributorships for certain areas are still open. Inquiries invited. *B. F. Goodrich Industrial Products Company, Marietta, Ohio.*

The B. F. Goodrich Company
Dept. K-79
Marietta, Ohio

Please send me free booklets on:

☐ Rigid Koroseal Pipe
☐ Rigid Koroseal Sheet

Name _____

Company _____

Address _____

City _____ Zone ____ State ____

When inquiring check 7000 opposite last page

Insulates and protects underground pipe from corrosion . . .

thick coating is manufactured from Gilsonite

Uses: For pipe insulation.

Features: In addition to insulating underground pipe, material provides protection from corrosion.

Description: Various melting point grades and sizes of Gilsonite, a natural hydrocarbon, are blended to form coating. When steam is introduced, coating fuses itself to pipe and forms a thick protective insulation which lasts a long time.

Material is economical to use since it is not necessary to wrap pipes, but simply fill in area around the pipes with the coating instead of earth.

(Insul-ite insulating coating is product of G. S. Ziegler & Co., Dept. CP, 99 Church St., New York 7, N. Y. . . . or check 7002 opposite last page.)

Eliminates galling of pipe threads . . .

Teflon compound also can be used to protect equipment

Primary use of liquid sealing compound is to eliminate galling of pipe threads and to act as a thread sealant. Material, which is a dispersion with a Teflon base, is inert to all chemicals except molten alkali metals, fluorine at high temperatures, and certain complex halogen compounds.

Besides application on pipe threads, material can be used to cast a film for capacitor layer insulation diaphragms, to impregnate porous bearings, and to provide a corrosion-resistant surface to protect equipment. It is also used to impregnate asbestos fabric and braid for gasket and packing use.

(Slic-Seal sealing compound is product of Hoke, Inc., Dept. CP, 145 S. Dean St., Englewood, N.J. Check 7003 opposite last page.)

TANTALUM... If you don't need it, you can't afford it. If you need it, you can't afford to do without it!

It is an easy matter to determine whether or not you need tantalum in your process. If tantalum eliminates shut-down, product contamination, side reactions, fume damage and other waste due to corrosion, *you need it!*

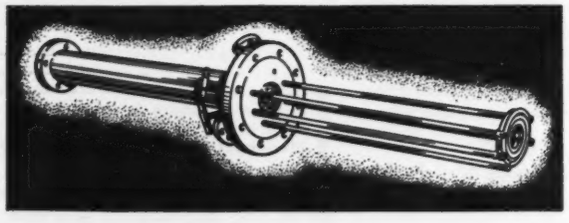
If tantalum increases equipment life four-fold, or more, even if it costs only twice as much...you need it!

Tantalum is immune (not merely resistant) to any of the following: hydrochloric acid, nitric acid, perchloric acid, bromine, iodine, hydrogen peroxide, chlorine, chlorine dioxide and many others. It is so slowly attacked by sulfuric acid that life may be measured in decades. It is strong, immune to thermal shock, unequalled in heat transfer efficiency.

Fansteel engineers can evaluate the pros and cons of tantalum very precisely as they apply to your process. From that point, it will be very easy for you to reach your own conclusions.

USE TANTALUM WITH ECONOMY for most acid solutions and corrosive gases or vapors.

Not recommended for HF, strong alkalis or substances containing free SO_3.



Write for free TANTALUM booklet today!

FANSTEEL METALLURGICAL CORPORATION
Chemical Equipment Division
NORTH CHICAGO, ILLINOIS, U.S.A.

G562A

When inquiring check 7001 opposite last page

Jars, pots, tanks, etc. made from "U.S." Chemical Porcelain are leak-proof, mechanically strong, dense and of virtual *zero* porosity. They are completely inert to all chemicals except hydrofluoric acid and hot caustics. And porcelain contains *no iron* to be absorbed — no induced contamination! Its non-aging characteristics make for long, maintenance-free service life. No-seam construction, rounded corners and smooth lustrous white glazed surfaces provide for quick, easy cleaning.

Our complete Chemical Porcelain line of jars, pots and tanks includes a wide variety of stock items in capacities ranging from 2½ to 500 gallons.

WRITE TODAY — *ask for* BULLETIN 410

U.S. STONEWARE *Process Equipment Div.* 2410-1
Akron 9, Ohio

When inquiring check 7004 opposite last page

Efficient — h = 260 BTU/hr./ft.²/Deg. F.

Cools corrosive fluids with **complete** protection

***PYREX* brand glass shell and tube heat exchanger**

Here's a new way to safely cool, condense, partially condense, exchange or reflux corrosive fluids and fluids sensitive to metallic contamination.

It's the PYREX brand glass shell and tube heat exchanger. In this unique new unit, fluids contact only glass, chemically resistant ceramic and Teflon. It brings you relief from fouling, corrosion and contamination. You can use either the shell side or tube side for all fluids except HF or hot concentrated phosphoric acids and alkalis.

You can choose from two capacities: 13½ and 50 sq. ft. Both are compact. The 50 sq. ft. unit, for example, requires only 9" x 13'6" floor space, 13" height and weighs just 165 lbs.

For complete details that show how the PYREX brand glass shell and tube heat exchanger can simplify your corrosive fluids processing, circle the reader service form at the back of this publication.

CORNING GLASS WORKS
Corning, New York
Corning means research in Glass

When inquiring check 7005 opposite last page

Turbogrid tray now available in glassed steel . . .

corrosion resistance, lack of product adherence, non-contamination among advantages

Operating advantages that have been possible with the Turbogrid tray are further increased with the availability of the slotted trays in glassed steel. Advantages achieved include resistance to corrosion at high temperatures and pressures, lack of product adherence, non-contamination, and absence of catalytic effects. Up to now it has not been possible to use a glassed-steel tray because of the problem of supporting it in an all-glass tower. Solution has been found in the recently developed tray design.

Trays are supported inside a glass-lined column by bolting glassed-Inconel cups to column sidewalls. Teflon-sheathed gaskets are used for sealing. These cups hold four extra-heavy, Pyrex-brand glass tray-support tubes, each encased in a Teflon or polyethylene shield to prevent wear of glass against glass. Small glass tubes are laid across supporting members. These small tubes are held in position by Teflon or polyethylene spacers and by another extra-heavy sheathed glass tube lying across them. Plastic plugs protect the ends of all tubes. Tray assemblies usually are inserted in columns with their tubes at a 90° angle to each other. Round glass bars provide a maximum exposure of gases to liquids.

Glassed-steel Turbogrid tray may be supplied for either glassed or stainless steel columns. It may be installed in new or existing equipment, with a diameter of 18" or larger. Typical installations include gas scrubbers and strippers, de-ethanizers, debutanizers, depropanizers, and chlorinated hydrocarbon fractionating units.

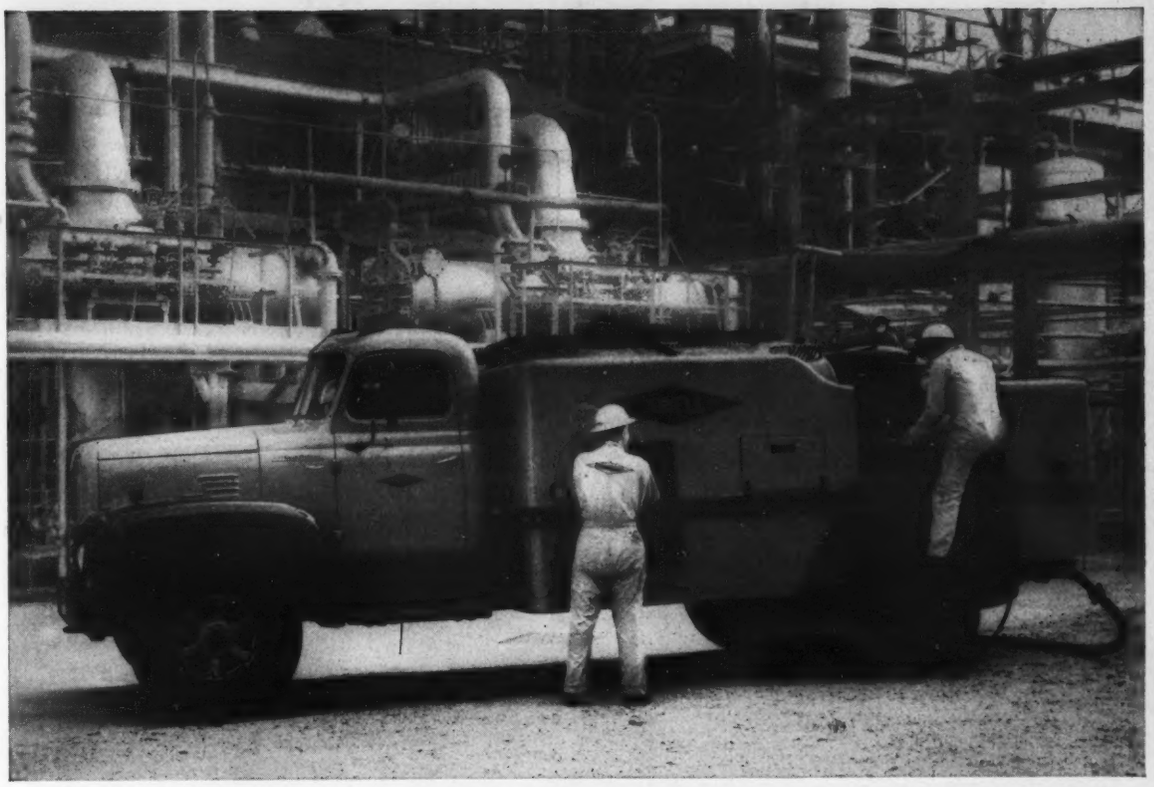
(Glassed-steel Turbogrid tray is product of Pfaudler Company, Dept. CP, Rochester, N.Y. . . . or for more information check 7006 on form opposite last page.)

Liquid neoprene coating now available . . .

product suitable for brushing or spraying, has long shelf life

Neoprene coating is announced that is in a liquid form suitable for brushing or spraying without the concern of watching the shelf life of the product. Hence, protective features of neoprene can easily be furnished to structural-steel shapes, pipes, and irregular areas. Excellent corrosion resistance of neoprene is well known.

(Rubber-coat liquid neoprene is product of The Wilbur & Williams Co., Dept. CP, 130 Lincoln St., Boston 35, (Brighton) Mass. . . . or for more information check 7007 on form which is located opposite last page.)



Dowell's Special Tank Trucks, equipped with proportioning and pumping equipment, bring solvents for chemical cleaning of industrial equipment to plant sites.

Monel handles dilute HCl day-after-day

in Dowell equipment-scrubbing units

When processors find it necessary to clean the interior surfaces of large industrial equipment of rust and scale, they often use the means provided by Dowell Incorporated. Dowell brings tank trucks to the plant site and pumps solvents through the equipment to dissolve and sweep away any deposits. The solvent usually has a dilute hydrochloric acid base; sometimes others are used. To prevent the equipment from corroding, the solvent contains specific inhibitors and is introduced under strict control of temperature and exposure time.

Pumps posed difficulty

The centrifugal pumps used to circulate the acidic solvent posed a real problem to Dowell. Centrifugal force and high velocities stripped protective coatings from impellers and nullified the effect of inhibitors inside the pump. A need was indicated for parts of durable, corrosion-resisting metal. Dowell's tests of many materials gave an answer . . .

Monel® nickel-copper alloy

Monel alloy, with its inherent resistance to dilute hydrochloric acid, is used by Dowell for pump impellers, stuffing box seals and shaft sleeves as well as for certain storage tank accessories.

You, too, may find Monel nickel-copper alloy an answer to your difficulty. Get the facts. Ask for Bulletin T-29, "Resistance of Nickel, Monel and Other High Nickel Alloys to Corrosion by Hydrochloric Acid, Hydrogen Chloride and Chlorine." It's yours for the asking.

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

Heart of a "Chemical Brush"... Monel nickel-copper alloy impellers like this are used in Dowell's pumps to introduce cleaning solvents into industrial equipment. They find that parts made of this alloy resist acidic and caustic solutions used in their operations.

INCO TRADE MARK **Castings...** *Sand, Centrifugal and Precision*

When inquiring check 7008 opposite last page

THIS newly opened Resistoflex headquarters is now producing record quantities of Fluoroflex® products.

Fluoroflex-T (Teflon) and Fluoroflex-C (Kel-F) rods, sheets, tubing, pipe, electrical sleeving, back-up rings, diaphragms and bellows are but a few of the many products now being produced on the most modern equipment . . . in bigger volume . . . a wider range of sizes . . . and the finest quality ever developed for vital applications.

Also greatly expanded is production of Fluoroflex-T hose . . . the *original* Teflon hose . . . the only one proved by over 3 years service and now so widely specified for aircraft and tough industrial applications.

More than ever now, Resistoflex is prepared to give you reliable service. Send for data or for quotations on your needs in Teflon and Kel-F products.

®Teflon is a DuPont trademark. Kel-F is an M. W. Kellogg trademark. Fluoroflex is a Resistoflex trademark.

20 years of service to industry

RESISTOFLEX

CORPORATION • Roseland, N.J. Western Plant: Burbank, Calif.

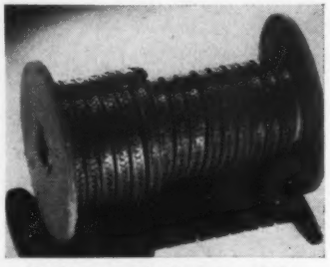
Warehousing Distributors: Western Fibrous Glass Products, Los Angeles, Calif. • F. B. Wright Co., Detroit Mich. • Colonial Kolonite Co., Chicago, Ill. • Industrial Safety Supply Co., Hartford, Conn. • Lone Star Rubber Co., Houston, Tex. • Flow Products Inc., Chicago, Ill.

When inquiring check 7009 opposite last page

Glass-and-Teflon packing withstands corrosion

Uses: Sulfuric acid, nitric acid, sodium hydroxide, aqua regia, and practically all solvents can be handled with packing.

Features: Fabrication of packing from glass and Teflon — two of the most inert fibers — gives it high corrosion resistance and long service life.



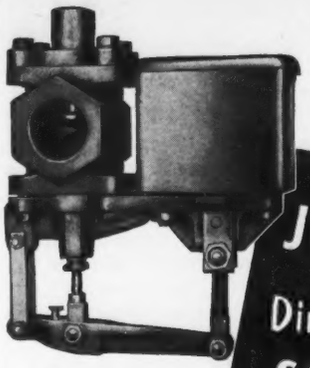
Packing is made from two of the most inert fibers available, Teflon and glass

Description: Pure Teflon fibers are braided over a core of glass fibers and then impregnated with Teflon. This packing is soft and pliable and has a low friction coefficient. It is excellent for use on centrifugal as well as reciprocating and static applications.

(No. 405 mechanical packing is product of Abbott & Biddle, Dept. CP, 2417-X33 Federal St., Philadelphia 46, Pa. Check 7010 opposite last page.)

"Best hose winder we've got!"

Lester May, Jr., works at Union Oil Company of California, Rodeo, Calif.



OUTSTANDING FOR STEAM SERVICE

JOHNSON Direct Operated SOLENOID VALVES

Stainless steel valve and seat. Sizes: ½" to 3". *Write for facts.*

Job after job, these Johnson Direct Acting Solenoid Valves are proving an ideal answer for service on steam lines. Their design removes the solenoid proper from the heat of the line, permits a leverage system with ample power to open against differential pressures up to 150 lbs. There are no pilot valves or auxiliary pistons, and construction is really heavy duty throughout. You will find their inherent simplicity and instant response will solve a lot of operating problems like no other valve can.

[redacted]

826 Wood St., Three Rivers, Mich.

When inquiring check 7011 opposite last page

CUSTOM FABRICATING DATA—*Request New Brochure M-56*

This information on plant facilities and services will be of value to purchasing, procurement and engineering personnel when planning the custom fabrication of...

CORROSION RESISTING VESSELS

for the Chemical Processing Industry on the West Coast

Send blueprints for prompt quotation on your next job

PS F SINCE 1900 PUGET SOUND FABRICATORS, INC.

3670 E. Marginal Way Seattle 4, Wash.

Craftsmen in steel plate and alloys up to 1"

When inquiring check 7012 opposite last page

Acid-proof silicate mortar resists nitric, sulfuric at 1900°F . . .

bonding material is non-corrosive to metals, doesn't react with lead

Uses: Product is designed for the installation and maintenance of stack linings and acid tanks. It is recommended for laying acid-proof brick or tile in combustion gas condensation and sulfuric acid production services.

Features: Material withstands nitric, chromic, and concentrated sulfuric at temperatures up to 1900°F for long periods. Product is non-corrosive to metals and will not react with lead or chrome-nickel alloys.

Description: Silicate bonding material is based on a precisely adjusted potassium silicate. It is essentially free from sodium silicate or other sodium compounds and contains no fluoride setting agent. Material gives high bond strength and excellent impermeability.

(Corlok silicate mortar is product of Pennsylvania Salt Manufacturing Co., Dept. CP, Three Penn Center Plaza, Philadelphia 2, Pa. . . . or for more information check 7013 on form which is located opposite last page.)

On corrosion-resistant plastics, cements, coatings, linings

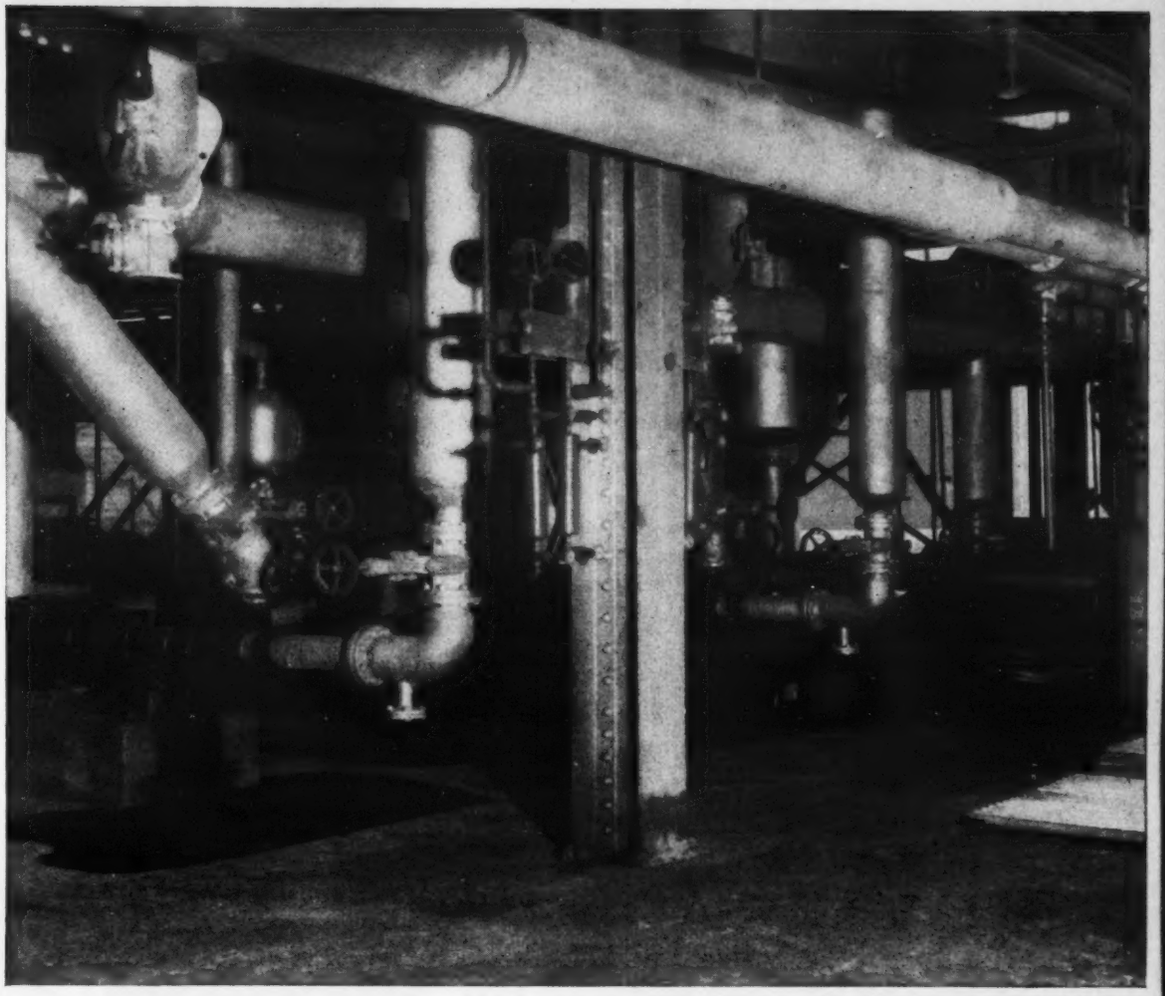
One outstanding feature of 16-page publication on corrosion-resistant rigid plastic fabrications, cements, coatings, and linings is the two-page data sheet in color showing the resistance of each product offered to a variety of corrosives. In other sections of the booklet properties and data on each material are given in detail.

Cat CC-3 is issued by The Atlas Mineral Products Co., Dept. CP, Mertztown, Pa. When inquiring about manufacturer's product reader may simply check 7014 on form which is located opposite last page.

you are reading **chemical processing** For Men who Manage

. . . because your are responsible for some phase of processing in your company. The Editors explain how you and other "men who manage" these operations are selected to receive the magazine regularly.

. . . see page 122.



Dependably Yours, too!

The men who know—experienced engineers who specify equipment for handling corrosive liquids—usually pick LaBour pumps.

In the large paper mill shown above, LaBour pumps handle the black liquor evaporating process. The designing engineers knew they could depend on LaBour pumps for continual day-in, day-out service with minimum interruption . . . and so can you.

It's this dependable performance and low maintenance cost that has motivated engineers, for the past 30 years, to specify LaBour pumps for their toughest chemical applications. With this enviable and unequalled background, LaBour pumps are the safe choice for your needs, whenever and whatever they might be.

So, take a tip from the experienced . . . don't lose unnecessary "down time" in your plant due to pump failure. LaBour pumps can be Dependably Yours, too.

LABOUR

When inquiring check 7015 opposite last page

VALUE!

Your first order will convince you!

"Metalsmiths" Stainless Steel and Monel Utensils

Prompt shipment —anywhere!

We've shipped "Metalsmiths" corrosion-resistant utensils all over the world for more than 30 years, with utmost satisfaction. Highest quality materials and workmanship assure long wear. All items shown, plus beakers, stock pots, batch cans and shovels in stock. Buy, try, compare.

WRITE FOR LATEST CATALOG — PRICE LIST

METALSMITHS

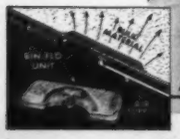
556 White St., Orange, N. J.

Specialists in Corrosion-Resisting Equipment

When inquiring check 7016 opposite last page

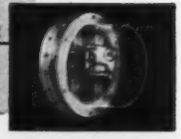
BULK MATERIAL CONTROL under Pressure or Vacuum

New Roto-Bin-Dicator mounts outside bin, at any angle, for bin level signaling or machinery control. Material loads on paddle actuate Micro switch in motor housing. Flexible paddle shaft permits use with large or lumpy materials. **Explosion-Proof U. L. Listed Units Now Available.**



BIN-DICATOR

BIN-FLO AERATOR



Low pressure air diffuser assures steady flow of fine, dry materials that tend to pack in storage.

The original diaphragm-type bin level indicator for all ordinary applications.

Complete Illustrated Literature FREE

THE BIN-DICATOR CO.

13946-D Kercheval • Detroit 15, Mich.

Phone: VAlley 2-6952

WE SELL DIRECT • PHONE ORDERS COLLECT

When inquiring check 7017 opposite last page

Ready to start buying polyester resins in tank-truck quantities? What kind of tanks and tank construction materials do you need . . . what kind of pumps . . . lines and piping? How do you protect the resins from moisture and temperature variances? Here, based on the latest data, are recommendations for . . .

handling polyester resins in bulk

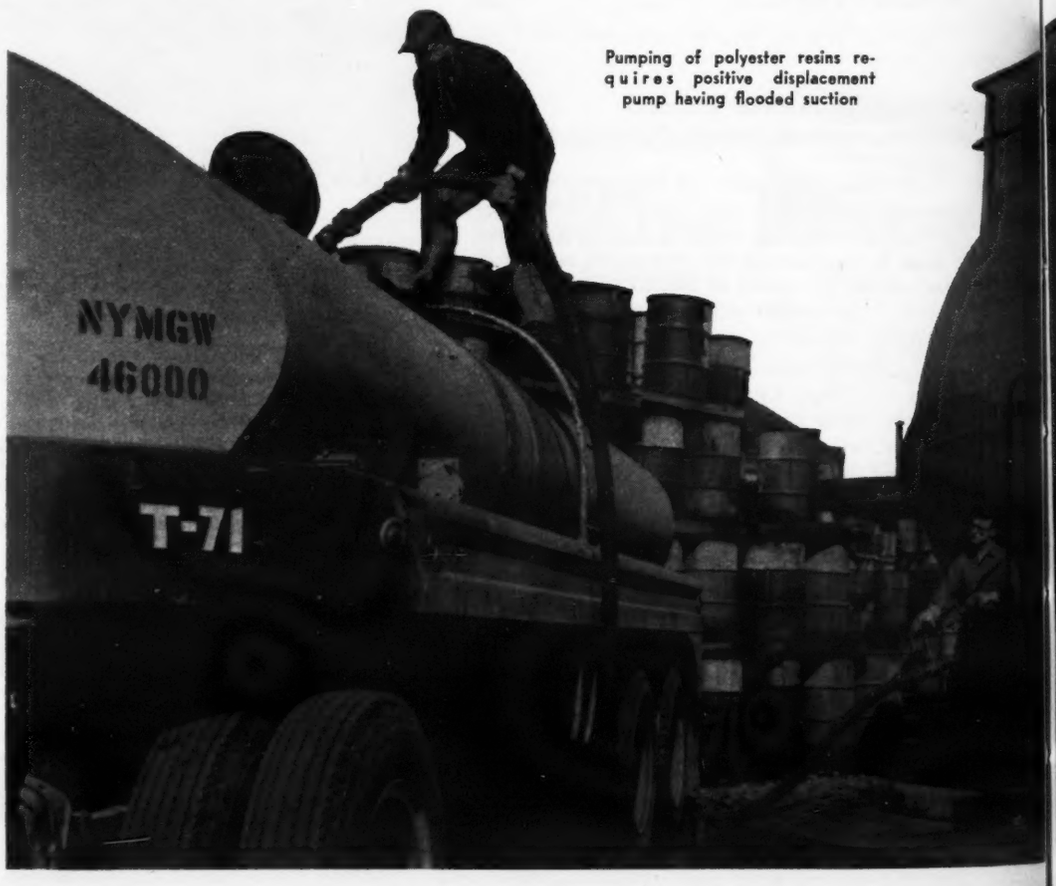
Increasing trend toward handling of polyester resins in bulk quantities has raised many questions. What is the best *and least expensive* material for tanks? How do the resins pump and what type pump is needed for the viscous material? This is a guide to facilities and precautions needed to take advantage of this money-saving handling method.

Storage

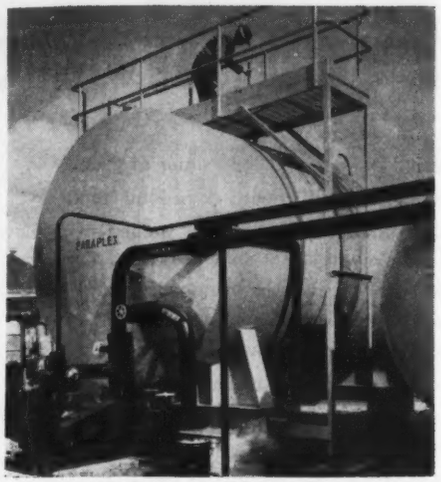
Most satisfactory storage tanks are constructed of stainless steel. Although less expensive materials can be used, superior resistance and longer service life of stainless usually justify its higher initial cost. Some economy can result from use of stainless-clad tanks but all connections should be of solid stainless. Mild steels are to be avoided because iron oxides are a weak accelerator for most polyesters.

Storage tanks should have a capacity of about 4000 gallons to handle load of one tank-truck. Larger vol-

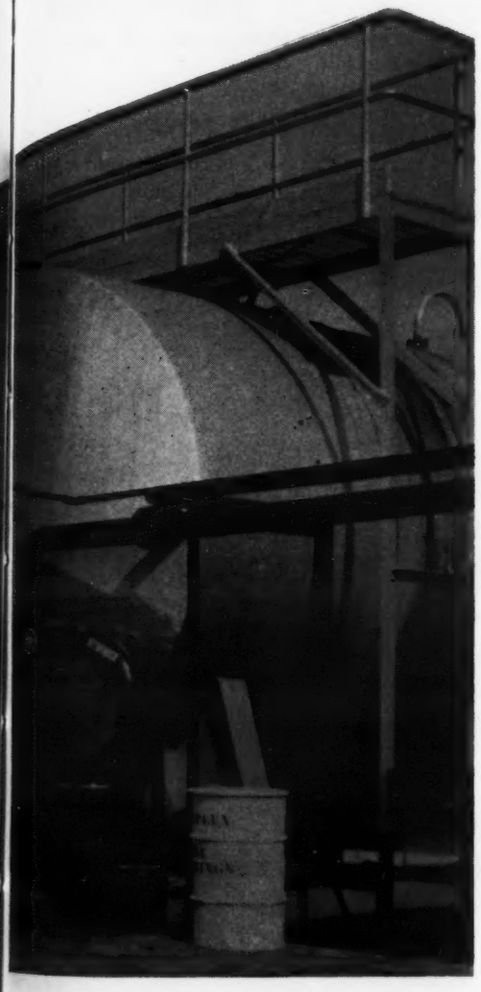
(*Please turn to page* 104)



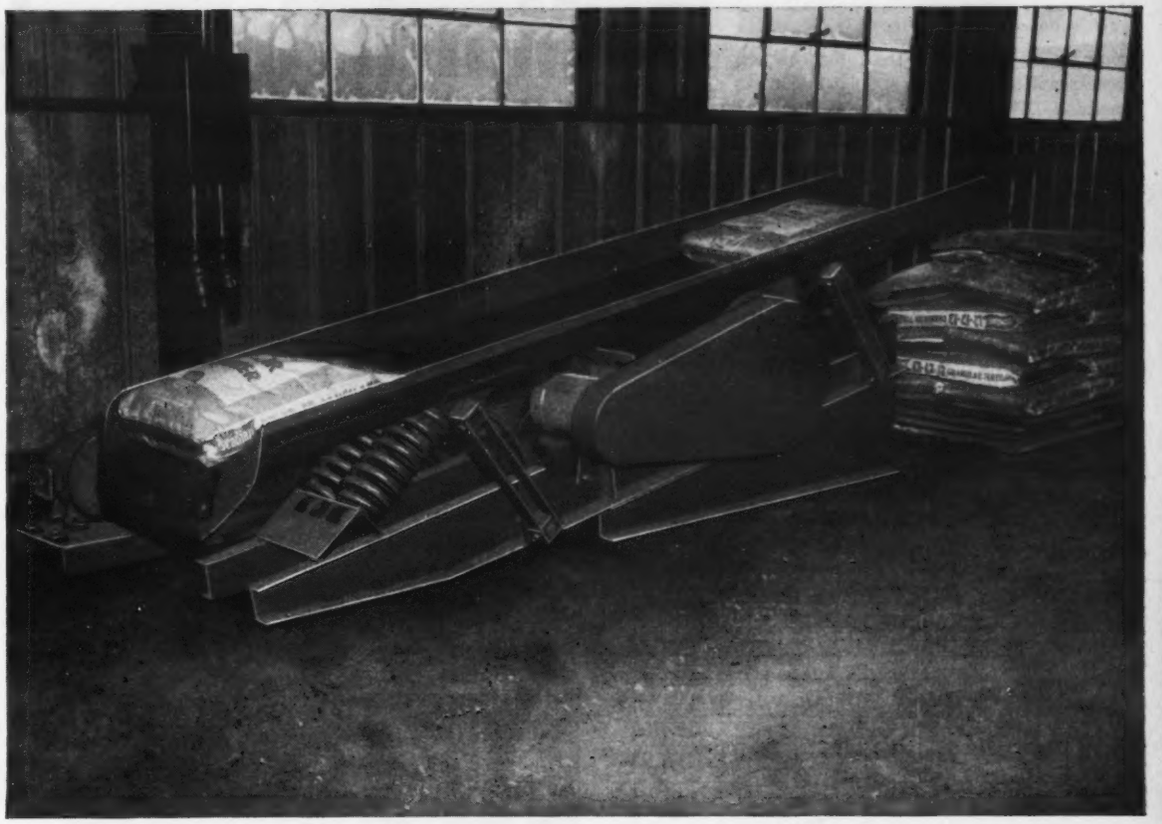
Pumping of polyester resins requires positive displacement pump having flooded suction



Top of tanks should be equipped with manhole to permit cleaning, inspection and level-checking



CARRIER *does the "IMPOSSIBLE" for the biggest names in industry!*



This Conveyor Stretches Freight Cars!

THESE bottom-heavy bags of plastic material are being flattened, for storage and palletizing for shipment, by a Carrier Natural-Frequency Conveyor...

They used to be flattened manually, one at a time, by two men who literally patted them into shape. It was a slow, expensive operation. And unfortunately, conventional bag flatteners couldn't do the job satisfactorily because the product was too light and fluffy.

The solution called for imagination and Carrier engineers were quick to supply it. They soon designed a Natural-Frequency Vibrating Conveyor that did the trick perfectly. It's a 9' conveyor that gently tosses the bags along a slight uphill grade. When the bags come off, they are so flat that *15% more of them can now be put in a freight car.* The whole operation has also been speeded up, and labor costs substantially reduced.*

Flattening bags is one of hundreds of unusual applications for Carrier Natural-Frequency equipment. It points up the versatility of Carrier products, the ingenuity of Carrier engineers (who are the actual parents of today's modern, *practical* vibrating conveyors, and who know more about this type of product than anybody else in the world).

Carrier Natural-Frequency Conveyors offer almost unlimited processing possibilities. Tell us the sore spot in *your* materials-handling or processing set-up and we'll be glad to submit recommendations.

**Carrier, in cooperation with your packaging engineers, can integrate the bag-filling, closing and flattening operations, without re-handling. Interested?*

CARRIER
~~NATURAL-FREQUENCY~~
CONVEYORS

Carrier Conveyor Corporation
223 North Jackson Street, Louisville 2, Kentucky

When inquiring check 7018 opposite last page

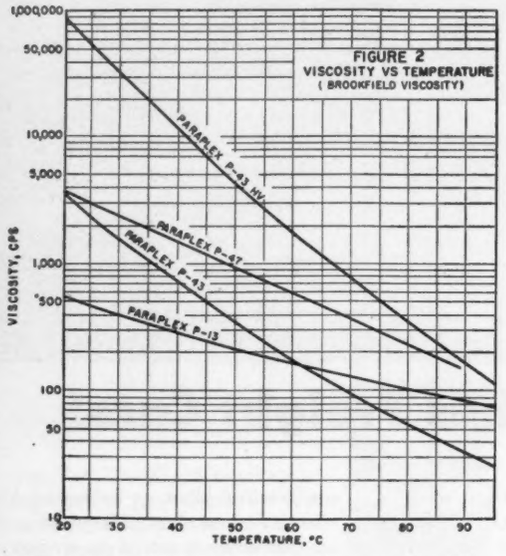
Handling Polyester Resins

(*Continued from page* 102)

ume users who use a truck load in less than two weeks will usually find 8000 gallon tanks more economical. The tanks should be completely emptied (and inspected) before each filling . . . preventing a "heel" of material that might gel in the tank if left undisturbed for an appreciable period.

Tanks, of course, should have a manhole to permit access for cleaning and inspection, and a three-inch IPS bottom outlet for complete draining. When cleaning tank, usual safety precautions for working in the presence of volatile flammable materials should be followed. Resin level can be checked most conveniently through top of tank.

Tanks should be equipped with temperature indicator



Temperature-viscosity curves for some commonly used polyester resins

having stainless bulb or thermowell . . . resin temperature should range between 60 and 90°F. Because reduced viscosity of resins below 60°F creates pumping difficulties, and because resins should not be heated, outdoor storage is ruled out in most localities. If storage temperature is likely to exceed 90-100°F for extended periods, tanks should be insulated with about two inches of mineral or glass wool. A non-insulated tank can be cooled with a trickle of water flowing over the shell.

In humid locations, substantial quantities of moisture can be drawn into tank as resin level drops, and will condense as atmosphere cools. This can be prevented by installation of a drying unit containing activated alumina or similar desiccant. Alumina which incorporates a color indicator gives a convenient guide to remaining drying capacity. Exhausted alu-

LOOK TO THE ALLIS-CHALMERS LINE . . . TO

Match the needs of your tractor sh

If you're looking for big capacity, mobility and wide-range versatility — at low cost — the tractor shovel you need is in the Allis-Chalmers line.

First — advanced-design features make Allis-Chalmers tractor shovels the most productive and widely accepted in earth-moving and material handling fields. Second — each unit offers a shovel that's a built-in part of the tractor — not just an attachment. Third — you have a choice of four sizes to match the needs of your jobs most efficiently.

You can increase Allis-Chalmers tractor shovel usefulness even more by replacing the standard bucket with a variety of quick-change attachments, such as a light materials bucket, rock bucket or rock fork . . . or by adding a rear-mounted ripper.

On every job, your Allis-Chalmers tractor shovel provides all these important advantages for you and your operator·

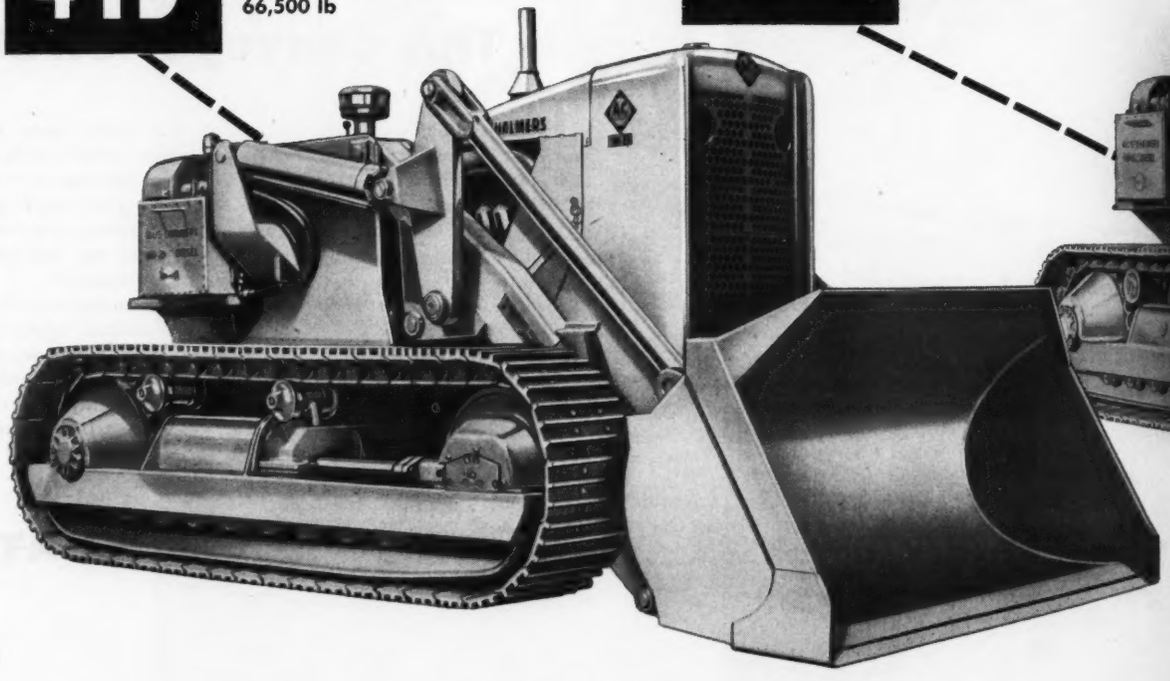
- Superior balance and low center of gravity
- Sure-footed stability with extra long track
- Greater strength with heavy, welded-steel shovel, side frames and low stabilizer
- Bucket design that makes loading and dumping fast, clean and easy
- Simplified hydraulics with 3-way, full-flow filtering
- Powerful, long-life Allis-Chalmers diesel engine
- All-steel main frame and one-piece final drive and steering clutch housing
- Timesaving service simplicity
- Heavy-duty roller bearing truck wheels
- 1,000-hour lube intervals on truck wheels, idlers and support rollers
- Better visibility, comfortable seats, and easy operating, accessible controls

4 YD

HD-21G
torque converter drive
13-ft, 4-in. dump height
204 net engine hp
66,500 lb

3 YD

HD-16G
torque converter drive
12-ft, 3-in. dump height
150 net engine hp
47,800 lb



mina can be reactivated in drying oven. Desiccator unit can be purchased with built-in heating element, so that alumina can be reactivated without removal from tank.

Pumps

Viscosity of polyester resins requires that pumping equipment and piping layout be planned by engineers familiar with viscous fluid applications. A positive displacement type of pump having flooded suction is essential. Feed line to pump should be as short as possible, and large enough to avoid starving pump. A straight run is recommended but if elbows are required, they should be 45° rather than 90° bends. Also, a basket-type strainer, constructed of 16-mesh stainless wire, should be installed on suction side of pump.

Feed Lines and Fittings

Distribution lines should be of thin-wall stainless pipe or tubing (schedule 5 pipe is satisfactory). Steel or brass lines and fittings should not be used. A minimum diameter of two inches is advised and in many cases a three-inch line will be satisfactory. Because of viscosity characteristics of resins, pressure drop in system should be carefully calculated before specifying distribution and pumping equipment.

Facilities should be provided for draining lines. During normal production periods, distribution lines may remain filled, but for longer shut-downs, lines should be drained. Distribution lines, like tanks, should be protected to keep resin temperatures between 60 and 90°F. Flanges should be used regularly to permit cleaning lines.

Valves should be of full-flow type, such as gate valves or plug cocks. Stainless steel valves are preferable but bronze may be substituted providing resin will not remain in contact with it long enough to pick up an appreciable concentration of copper which is a mild inhibitor of polyester polymerization.

(Information courtesy of Rohm & Haas Co., Dept. CP, 222 West Washington Square, Philadelphia 5, Pennsylvania.)

Describes roll handling operations

Eight-page brochure describes in detail various installations of paper roll handling equipment. Among plant systems described are: newspapers, public warehouses which handle paper for newspapers, manufacturers, and printers.

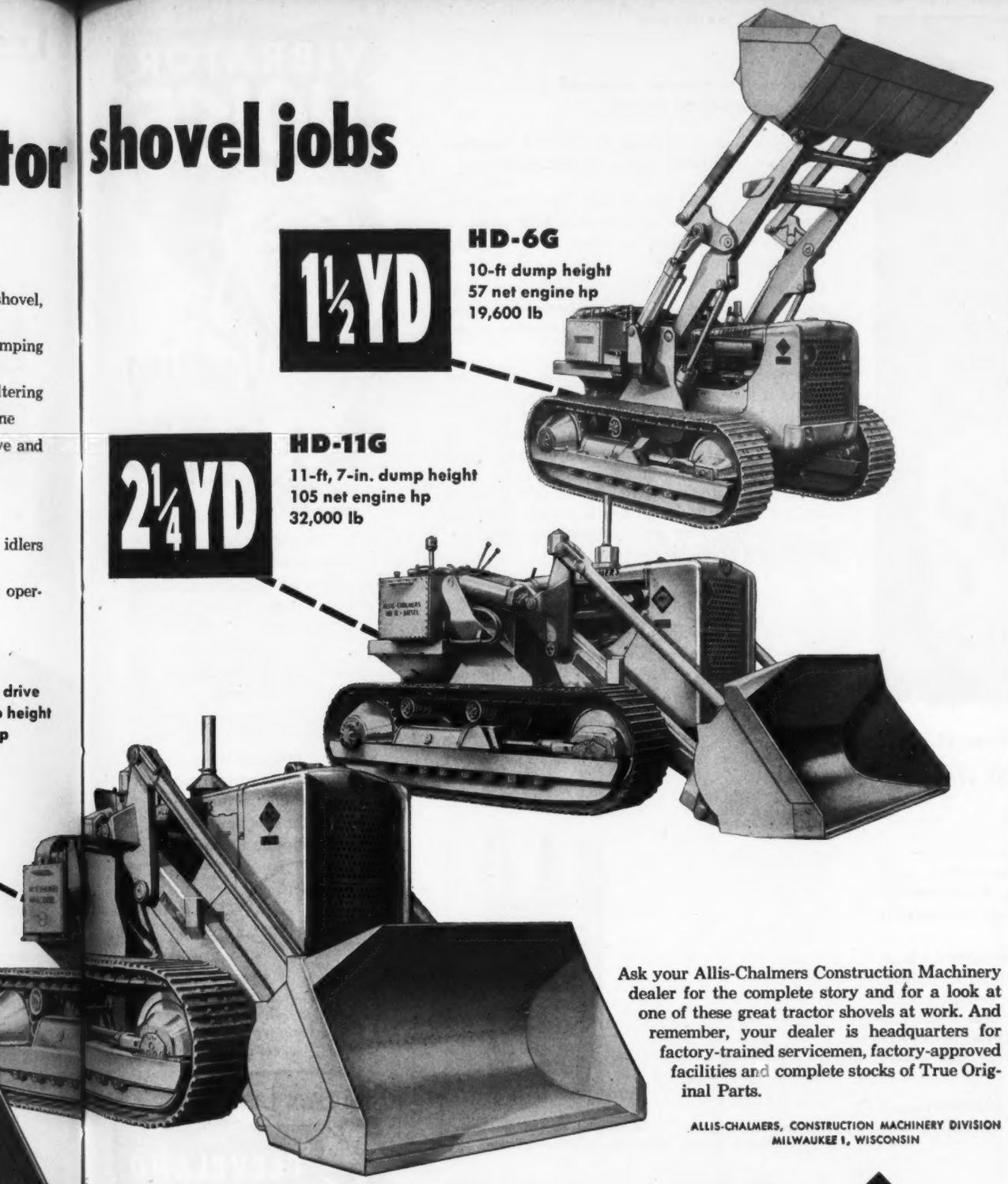
Equipment and methods described range from heavy-duty clamp trucks to 2-wheel hand trucks. Equipment recommendations for a variety of roll handling problems also are noted.

"Roll Handling" is issued by Department R-22, Lewis-Shepard Products, Inc., Dept. CP, Watertown, Mass. Specify 7020 opposite last page.

shovel jobs

1½YD **HD-6G**
10-ft dump height
57 net engine hp
19,600 lb

2¼YD **HD-11G**
11-ft, 7-in. dump height
105 net engine hp
32,000 lb



Ask your Allis-Chalmers Construction Machinery dealer for the complete story and for a look at one of these great tractor shovels at work. And remember, your dealer is headquarters for factory-trained servicemen, factory-approved facilities and complete stocks of True Original Parts.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION
MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

When inquiring check 7019 opposite last page

the gas fork truck that makes the fewest and shortest trips to the maintenance shop...

BAKER "FG"

Industrial trucks "out-of-service" mean dollars down the drain . . . not only repair dollars, but even more dollars for lost work. That's why we loaded the Baker "FG" gas trucks with features that mean substantially more time on the job. Here are a few:

Heavy-duty industrial truck engine operates at optimum RPM for least strain and abuse. Pistons are balanced to grams instead of ounces, crankshaft to 4 inch-ounces, connecting rods to 2 grams. Compact, rigid "power train" requires no troublesome universal joints. Clutch housing is split for better accessibility. Single oil supply lubricates entire assembly. Large full-floating, self-equalizing, self-energizing brakes have single-point adjustment.

Baker "FG" gas fork trucks, available in 3000, 4000, 5000 and 6000 pound capacities, are the only gas trucks with a full 6-months' warranty . . . an added assurance. Write for specific bulletins.

Baker handling equipment

THE BAKER-RAULANG COMPANY
1208 West 80th Street • Cleveland 2, Ohio

A subsidiary of Otis Elevator Company

6G2A

When inquiring check 7021 opposite last page

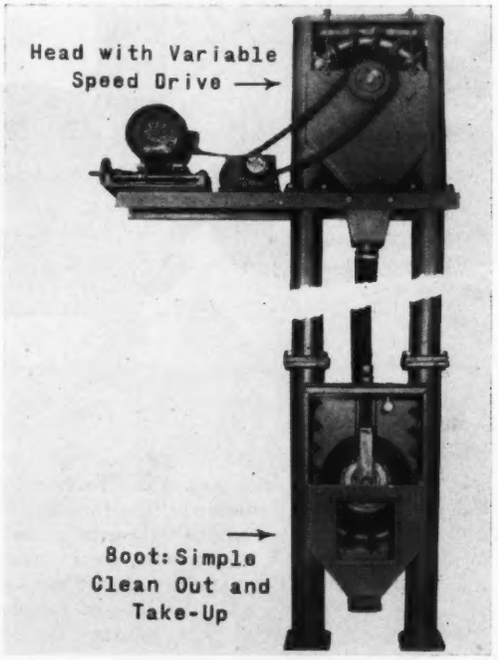
Sprocketless elevator powered with rubber-tired wheels . . .

cable and tubes built in standard lengths—units may be assembled to any height

Uses: Designed for elevating free-flowing materials as plastic powder, chemicals, food products, or coal, unit is available with tubes of four, eight, or twelve-inch diameter.

Features: Unit is powered with pneumatic, rubber-tired drive and take-up wheels, eliminating drive sprockets. Take-up screw provides adjustment for cable stretch.

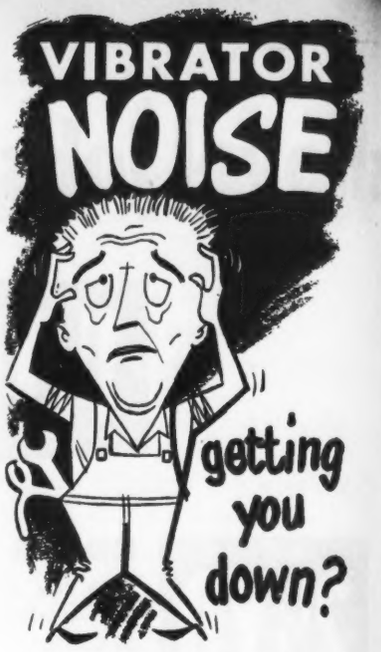
Description: Elevator is available with either center discharge chute for low speed operation at 60 fpm or side discharge for high speed operation up to 250 fpm. Unit consists of standard steel cable carrying concave stamped or cast metal buckets, uniformly spaced by heavy springs under compression. Flexible connection joins cable ends. For sanitary applications, springs are covered by synthetic tubing spacers under compression, effectively sealing out conveyed materials.



Assembly consists of cable carrying concave buckets uniformly spaced by springs under compression

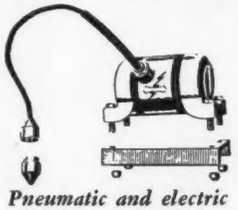
Both cable and tubes are built in standard section links, and elevators can be assembled to almost any practical height.

(Unit is built by Hapman Conveyors, Inc., Dept. CP, Kalamazoo, Michigan . . . or for more information check 7022 on form which is located opposite last page.)



The racket caused by conventional electric vibrators can drive a man out of his mind. So why torture yourself and your employees . . . solve the problem with the new *silent* Cleveland Electric Vibrators.

These new vibrators operate on the eccentric-weight principal —they make no more noise than an electric motor. For detailed information, write for our new Electric Vibrator Catalog.



Pneumatic and electric vibrators for your every need.

2706 Clinton Ave. • Cleveland 13, Ohio

When inquiring check 7023 opposite last page

Designed for carloader service, belt withstands high speeds

Uses: "Thrower" or "slinger" belts are designed for service on carloaders, handling such materials as fertilizer, chemicals, clays or grain.

Features: Construction of thin belt — without top and bottom covers of rubber — avoids high temperatures sometimes developed by flexing over small pulleys at high belt speeds (2100 fpm).

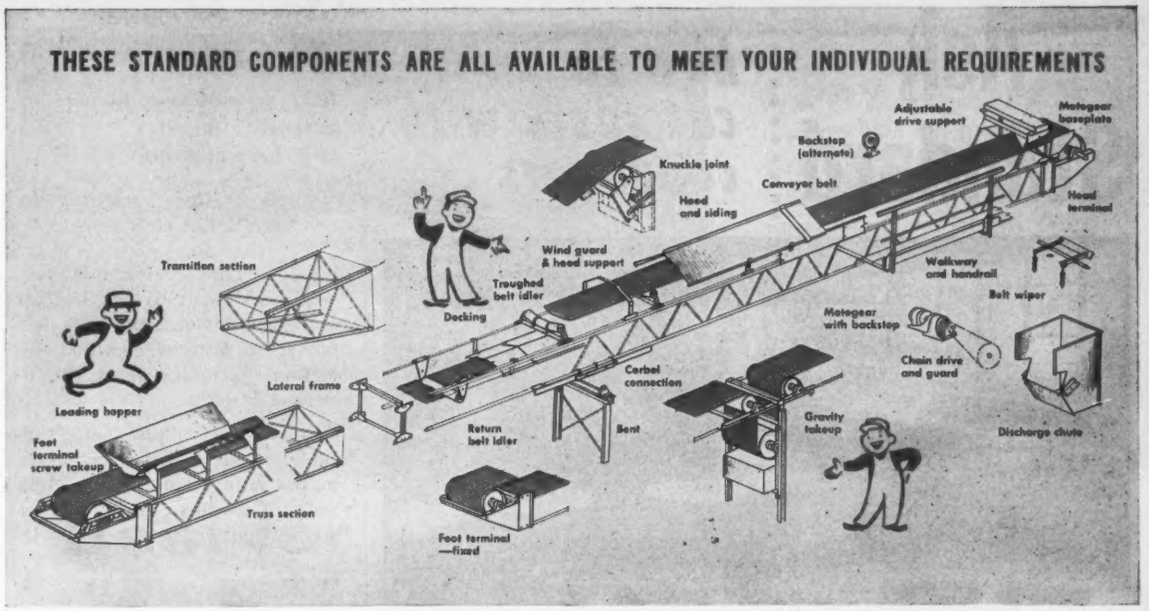
Description: Carloader belts are available in three sizes, all made endless by vulcanizing at

Construction of belt resists high temperature developed by running on small pulleys at high belt speeds

manufacturer's plant: 24″ by 7′10″, 10″ by 6′, 16″ by 5′8″.

(Carloader belts are manufactured by the Thermoid Company, Dept. CP, 400 Whitehead Road, Trenton, N. J. Check 7024 opposite last page.)

"I thought I told you to hold my calls!!"



NOW! The advantages of engineered belt conveyors in a LINK-BELT

PRE-BILT PACKAGE

easy selection

Your Link-Belt representative will help you select the best combination of PRE-BILT sectional belt conveyor components.

Standard 18, 24, 30 and 36-inch widths need no special engineering

Here's an economical, standardized belt conveyor "package" . . . ready to meet the majority of belt conveyor needs and perform dependably for years and years. It combines standard Link-Belt products with sectional truss frames and steel supporting bents.

Book 2579 has further data on Link-Belt PRE-BILT conveyors . . . with drives up to 40 hp and 24 and 42-inch truss depths. Write today, or ask for a copy at your nearest Link-Belt office.

LINK-BELT

14.114

BELT CONVEYOR EQUIPMENT

prompt quotations
He will prepare a comprehensive and accurate estimate of requirements for installations that permit "on-the-ground" survey.

simplified purchase
Parts are standardized, interchangeable, all available from one supplier. Link-Belt representative can furnish all data.

quick delivery
PRE-BILT conveyors are built at nine strategic locations throughout the country and are shipped from the plant nearest you.

fast installation
Can be readily handled by your own erectors in most cases. Link-Belt can also furnish complete erection service and supervision.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

When inquiring check 7025 opposite last page

Ask Standard ⋮ how to cut costs with conveyors

Live roller and gravity roller system handles 55 gal. drums from storage through filling and weighing operations to shipping.

No manpower needed to keep heavy drums moving

STANDARD conveyor systems keep heavy, bulky commodities moving with minimum manpower and time loss. Systems can be job-tailored to any specific materials handling problem — to meet almost any needs.

With more than 50 years of experience in conveyor application, Standard engineers are qualified and ready to help solve your handling problems. Standard builds permanent or portable systems and units, using roller, belt, slat, chain, push-bar or sectional conveyors — power or gravity; also spiral chutes and pneumatic tube systems. Consult STANDARD CONVEYOR COMPANY General Offices: North St. Paul 9, Minnesota. Sales and Service in principal cities.

Cut costs, too, in shipping and receiving operations with Standard portable units, either powered or gravity operated. (Left) HANDIBELT portable powered conveyor unit (right) LITEWATE Sectional Roller Conveyor.

Call the Standard engineer listed in your classified phone book, or write direct for Bulletin 309 — address Dept P-8.

Standard 50 years of conveyor experience

GRAVITY & POWER CONVEYORS

Sales and Service in Principal Cities.

When inquiring check 7026 opposite last page

MATERIAL HANDLING

15½ pounds keep guard in touch with office anywhere in plant . . .

transistorized transceiver delivers a full eight watts

Uses: Line of portable two-way radio phones is designed for in-plant communications. System can speed material handling operations, is useful in plant protection, maintenance.

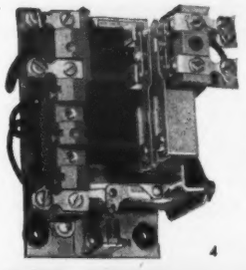
Features: Complete line includes models with RF power output ratings from one to eight watts. Coincident with the increased power output is a decrease in weight and size of as much as 50%. Extensive use of transistors, including use in transistorized power packs, extends battery life for minimum operating costs as well as decreasing weight.

Smallest portable unit weighs only 7-lb, 9-oz complete

Description: Radio phones are equipped with "snap-on" power pack. Dry cell, wet cell, and 117v AC power packs are interchangeable. Wet cell power pack employs lifetime, rechargeable nickel-cadmium cells and includes option of operation from 6 and 12 volt vehicular batteries.

Line includes models in 25-54 mc and 144-174 mc frequency range, in both handset-type microphones and palm-type microphone versions.

(Portable radio phones are product of Communications & Electronics Div., Motorola, Inc., Dept. CP, 4545 W. Augusta Blvd., Chgo., Ill. Check 7027 opposite last page.)



The original—pioneered by B/W in 1933. No floats! No moving parts in liquid. Literature describes relays and starters, automatic starter and relay combinations, multiple pump controls, special controls and panels and many application diagrams.

Controls not affected by pressures, temperatures, acids or caustics. Remote control if desired. Ice free electrodes where necessary.

4 WRITE FOR CATALOG

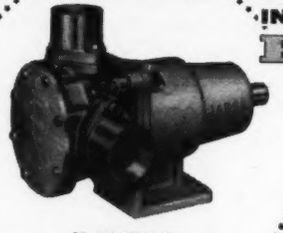
B/W CONTROLLER CORPORATION

2204 E. Maple Road, Birmingham, Mich.

When inquiring check 7028 opposite last page

cut pumping costs with

JABSCO INDUSTRIAL PUMPS



- INSTANTLY SELF-PRIMING
- SIMPLE, COMPACT, ONLY ONE MOVING PART
- DURABLE NEOPRENE IMPELLER
- SELF-LUBRICATED
- TROUBLE-FREE OPERATION

Model 3200-2"
Bronze Construction—
Base Mount—Sealed
Ball Bearings

JABSCO PUMPS

HERE'S another Jabsco industrial pump – designed and built for chemical, pharmaceutical and other industrial applications. Ideal for transfer of various liquids and acids – sump drainage, coolant pumping, general transfer, pulp in solution, filtering, brines, plating solutions – even fluids containing foreign matter or particles, silt, crystals, and other gritty materials. Bronze, stainless steel or plastic construction is available to *solve your specific* pumping problems. Pumps either light or heavy viscous liquids. Temperature ranges from 35° to 180° F. Write for a Jabsco factory recommendation for your own needs. Specify application, fluid pumped, temperature, pressure, etc.

PATENTED AND PATENTS PENDING

FREE – send for catalog sheets, detailed information... no obligation, of course!

JABSCO PUMP COMPANY

2031 Lincoln Street, Burbank, California

When inquiring check 7029 opposite last page

Operates in six-foot aisles — with two-ton loads . . .

side-loading principle permits operation without truck's turning in aisle

Working in aisles as narrow as six feet, unit operates on side-loading principle, so that it does not have to turn to face its load. Required aisle width is fixed by width of truck, not length of truck and load.

With a capacity of 4000 pounds, truck is of standup rider type with full size wheels, automotive-type steering, and hydraulic brakes. Unit has a 130-inch maximum lift, 31 fpm loaded lift speed, parking brake, 5° tilt forward and back, free lift of 67½ inches and compartment for standard batteries up to and including 25.20 kw-hr.

For in-plant delivery and pallet rack and "Christmas tree" warehouse operations, unit permits substantial savings in aisle space with no sacrifice of speed or capacity. Unit has forward and rear deck connected by rigid frame on left side, with open bay between them at right side. Mast operates in this bay, hydraulically extending up to 52 inches beyond the bay to pick up or deposit loads, then retracting into bay for travel. Truck can be used with standard or master pallets, or with long loads such as lumber, pipe, or structural steel.

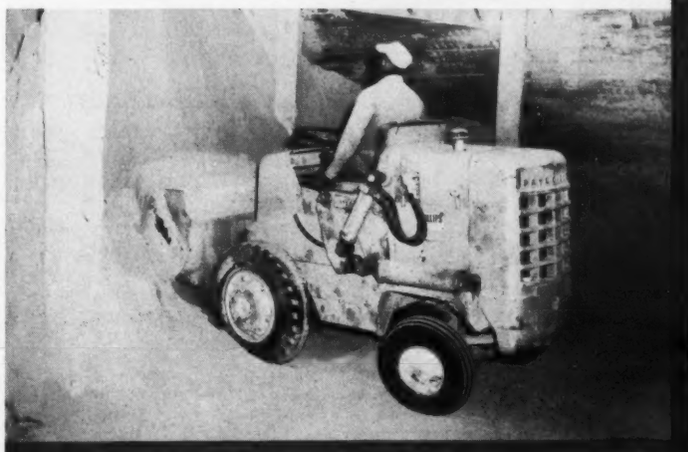
Side-loading principle permits operation in aisles as narrow as six feet

(TE-4 Traveloader is manufactured by Baker-Raulang Company, Dept. CP, 1260 W. 80th St., Cleveland 2, Ohio . . . or for more information about manufacturer's product, reader may simply check 7030 on form opposite last page.)

"A **PAYLOADER**® is a machine designed to give good service. The roll-back bucket of the new design model HA digs and pries the load better and is easy on the operator."

Signed G. E. BURNS, *Plant Mgr.*
Acme Fertilizer Company
Acme, N.C.

Best for your operations too!



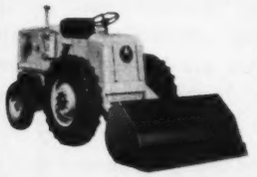
"Our new model HA **PAYLOADER**® does the work of two machines on some of the plant operations."

(Signed) ERNEST DICKERSON, *Plant Supt.*
Valiant Fertilizer Company
Laurel, Del.

From chemical, fertilizer and many other kinds of plants come words of praise and satisfaction over the performance of the new-design model HA "PAYLOADER". Built to scoop-up and carry more material for its weight than any tractor-shovel near its class, the new HA is way ahead of the field in the *kinds* of work it can do — in the *amount* of work it can do.

Torque-converter drive; full-reversing transmission; 40-degree bucket tip-back at ground; closed, pressure-controlled hydraulic system with built-in shock absorber . . . these are but a few of the many tried and proven plus values in the new HA that contribute to its leadership in performance, low maintenance and long life. Your Hough Distributor is eager to show you what the new HA or a larger "PAYLOADER" can do for you.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY



For higher lifts and more production a bigger front wheel drive unit — model HAH 1 cu. yd. capacity.

THE FRANK G. HOUGH CO.
744 Sunnyside Ave., Libertyville, Ill.

☐ Send data on Model HA (1¼ cu. yd.)
☐ Send data on Model HAH (1 cu. yd.)
☐ On larger models up to 2¼ cu. yd.

Name
Title
Company
Street
City
State

When inquiring check 7031 opposite last page

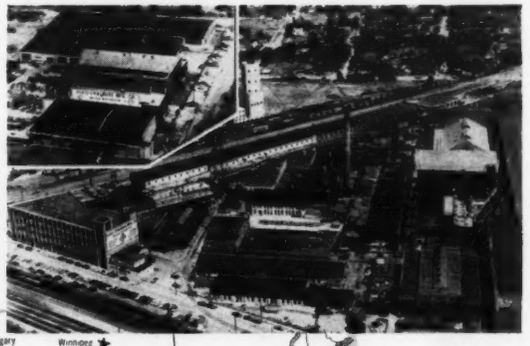
Engineering in Action

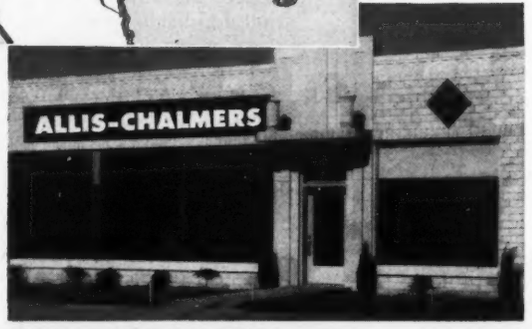
...BACKED UP *three deep*

with parts and service—when you use

Allis-Chalmers
FORK TRUCKS

Strategically located FACTORY





Your nearby DEALER

You enjoy almost "Factory-town" service wherever you are when you operate Allis-Chalmers Fork Trucks — for you are backed up *three deep* by Allis-Chalmers' highly successful dealer-branch-factory system.

What does this mean? It means that your dealer is serviced directly from a nearby factory branch — *one of 14*. Each branch carries a full stock of True Original Parts and is staffed with factory-trained servicemen as well as sales engineers. This assures prompt attention whether you need a replacement part or technical advice.

Ask your Allis-Chalmers material handling dealer to show you how Engineering in Action with this *three-deep* service can help on *your* specific job. Write for literature and details.

MATERIAL HANDLING DEPT., BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

BH-21

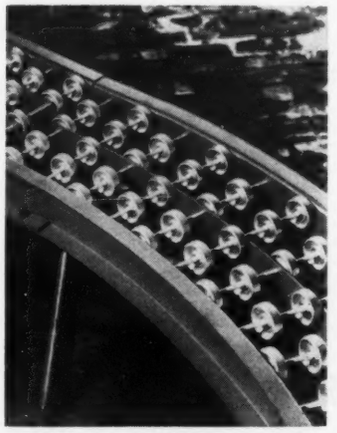
Gravity conveyor handles 1500 lb over 10′ span . . .

available with wheel patterns from six to 36 wheels per foot

Uses: Units are designed for gravity conveying of boxes, cartons, and pallets.

Features: Side members are 3½ x 1⅜″ hot-rolled formed steel channels, having capacity of approximately 1500 lb distributed load in 10 feet.

Description: Built in 5 and 10′ straight sections and 45° and 90°



Units are available with wheel patterns from 6 to 36 wheels per foot

curves, conveyors are available in 12, 14, 18, and 24″ widths. Sections may be had with wheel patterns from six to 36 wheels per foot. Axles are spaced on 3″ centers.

(Gravity conveyors are manufactured by Sage Equipment Company, Incorporated, Dept. CP, 30 Essex Street, Buffalo 13, New York. . . . or for more information about manufacturer's product, reader may simply check 7032 on the Reader Service slip which is located opposite last page.)

For more information on product at left, specify 7033 . . . see information request blank opposite last page.

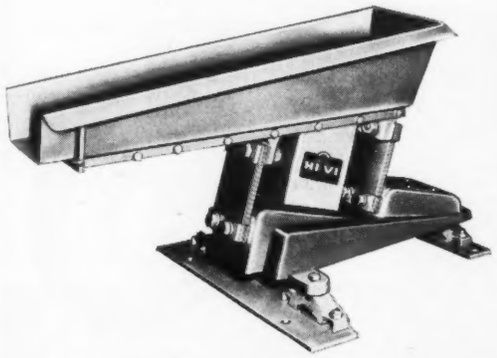
Vibration without rectification — unit feeds wide variety of materials . . .

electro-permanent magnetic drive eliminates bearings, friction-producing parts

Vibratory feeder operates directly on available 115 or 230 volt AC, needing no rectifier, and has simple electro-permanent magnetic drive, eliminating need for bearings and friction-producing parts.

Designed for such varied handling operations as heating, mixing, drying, cooling, packing, conveying, and spreading, unit handles wide variety of bulk materials from large stones or coal down to fine powders.

Flexible control of feed rate is readily obtainable with use of remote controller which contains no



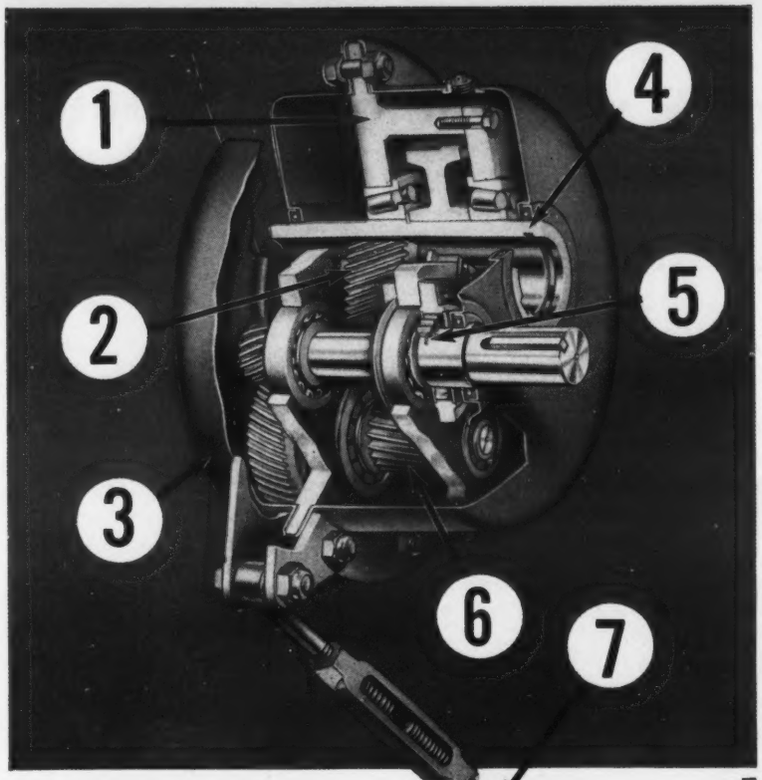
Feeder handles variety of bulk materials from large pieces of stones or coal down to fine powders

rectifier, merely a rheostat to control voltage across the unit. Heart of feeder is enclosed drive element that combines electro-magnet with Alnico V permanent magnetic armature.

Principle is used of magnetic attraction and repulsion between magnetic poles that are constant in permanent magnet and are alternating in electro-magnet. Alternating current sets up rapid oscillation of armature, powered on both strokes, to which is added the driving force of two steel springs between which the drive element is mounted.

Three standard feeder models are currently available, rated as capable of moving two, four or ten tons of dry sand per hour in normal operation. Trays are available in a range of shapes and are made either of regular 16-gage steel or 16-gage 304 stainless, all with welded seams. Units are available with weather- and dust-resistant housings at no extra cost.

(HI-VI Electro-Permanent Vibratory Feeder is manufactured by Eriez Manufacturing Co., Dept. CP, Erie 6, Pa. . . . or for more information check 7034 on form opposite last page.)



Here is the "INSIDE INFORMATION" on FALK ALL-STEEL Shaft Mounted Drives

Take a careful look inside the Falk all-steel Shaft Mounted Drive, and you will know why this newest member of the famous Falk family is ideal for applications where direct mounting on the driven shaft is desirable. It is the only drive in its field with all these superior "In-built" factors:—

1 **All-steel Frame,** with more than double the rigidity of iron, supports all rotating elements.

2 **Precision Helical Gears,** designed and machined by Falk, rated to AGMA standards.

3 **Pressed Steel Housings,** whose sole function is to keep oil in, dirt out; easily removed for gear inspection without dismounting unit.

4 **Through Hollow Shaft** with counter bore provides for easiest installation or removal from driven machine shaft extensions.

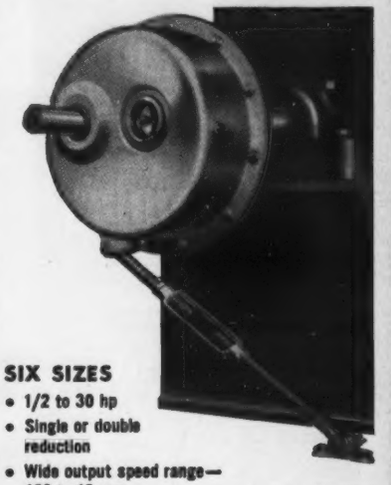
5 **Backstop** can be furnished with the unit or added later for positive prevention of reverse rotation.

6 **Positive Lubrication,** continuous direct dip of revolving elements at all speeds.

7 **Tie Rod** and turnbuckle serve as anchor and facilitate V-belt or chain adjustment.

Write to Department 247 for engineering bulletin, including selection and dimension details.

EFFICIENT SPEED REDUCTION IN LIMITED SPACE

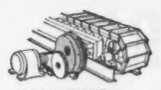


SIX SIZES

- 1/2 to 30 hp
- Single or double reduction
- Wide output speed range— 420 to 10 rpm

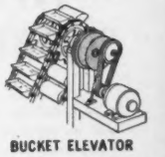
Expressly designed for topflight performance on installations requiring considerable speed reduction in limited space, the all-steel FALK Shaft Mounted Drive has quickly won acceptance throughout industry. This sturdy, compact, versatile reducing unit is an ingenious variation of the highly successful FALK Motoreducer design, pacemaker in its field for more than 20 years. Here, the time-proved design is adapted for mounting directly on the shaft to be driven, using V-belt connection to motor. Investigate now!

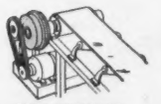
A FEW TYPICAL APPLICATIONS


APRON FEEDER

LINE SHAFTING

SCREW CONVEYOR


BUCKET ELEVATOR


BELT CONVEYOR

GRAVEL CLASSIFIER

THE FALK CORPORATION, Milwaukee 8, Wisconsin

MANUFACTURERS OF

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

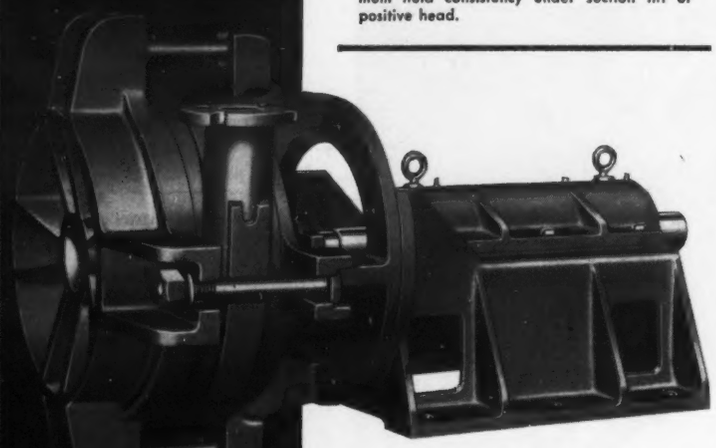
FALK

. . . a good name in industry

When inquiring check 7035 opposite last page

For Continuous Heavy-Duty Pumping

The Morris Type RX Pump shown below is a heavy-duty, low-speed all metal slurry pump expressly designed to handle abrasive slurries, chemical sludges, plant wastes etc. up to maximum fluid consistency under suction lift or positive head.



In slurry-handling operations, "long-term service" is a meaningless claim unless the pump will work day-in and day-out with a minimum of maintenance time, trouble and expense.

Morris Slurry Pumps—with an established reputation for longer life—also incorporate in their design exclusive features which result in easier installation . . . fewer interruptions to service . . . less overhaul . . . fewer replacements.

To Provide Uninterrupted Service...

The gland is under suction pressure only. This reduces leakage and dilution . . . keeps harsh abrasives out of the stuffing box . . . practically eliminates packing troubles.

There are no internal studs or bolts. Caustic and corrosive solutions cannot seep past threads and cause maintenance headaches.

Impeller removed without disturbing the piping. You simply loosen 4 outside clamping bolts and pull off the end cover. This feature alone saves considerable time and labor.

MORRIS
TYPE RX
SLURRY PUMP

• Free Service. Morris Engineers will be glad to recommend the pump best suited to your needs for size, capacity, etc. Send necessary data today . . . include request for Bulletin 185.

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Sales Offices in Principal Cities

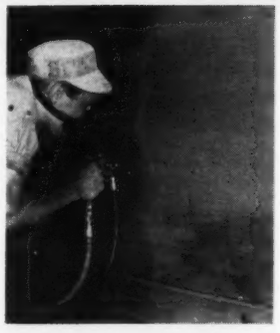
MORRIS
CENTRIFUGAL PUMPS

When inquiring check 7036 opposite last page

Boxcars relined in 2 to 3 hours

Sprayed plastic coatings and glass fiber provide tough, smooth surface that resists heat and cold

Damaged linings in boxcars can now be repaired, or entirely replaced, in two or three hours. Shipments that formerly had to be held up from 70 to 100 hours while cars were reconditioned can now go forward with a minimum wait. Process employs a sprayable resin and a glass reinforcing cloth. Resulting linings are extremely tough and good for extended heavy-duty service. They have a smooth surface that protects bags and cases against damage.



Base coat of resin is applied with conventional pressure spray equipment

After glass fiber cloth is placed over first coat, second coat is applied, drying to hard, rigid finish

Here's how it works: First, a base coat of resin is applied, using conventional pressure spray equipment. Then a glass fiber reinforcing cloth is put over the wet, tacky first coat, covering any holes or rough, splintered areas. Later, a second coat of plastic is sprayed over the cloth. This second coat dries to a hard, rigid, smooth finish. Cars are ready for use in three or four hours.

Two men often reline a car in as little as two hours. Maximum cost of a reline job is around $150.

IF YOU USE CASTERS & WHEELS

here's the handbook you should have

Write for your free copy of this important booklet today!

Check these advantages

RUBBER TREADS . . . a wide choice of treads suited to all types of floors, including Darnelloprene oil, water and chemical-resistant treads, make Darnell Casters and Wheels highly adapted to rough usage.

RUST-PROOFED . . . by zinc plating, Darnell Casters give longer, care-free life wherever water, steam and corroding chemicals are freely used.

LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water. Quick grease-gun lubrication provides easy maintenance.

STRING GUARDS . . . Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.

DARNELL
CASTERS AND WHEELS

DARNELL CORPORATION, LTD.
DOWNEY (LOS ANGELES COUNTY), CALIFORNIA
60 WALKER STREET, NEW YORK 13, NEW YORK
36 NORTH CLINTON STREET, CHICAGO 6, ILLINOIS

When inquiring check 7037 opposite last page

Linings do not soften at high temperatures up to 250°F, nor do they become brittle and crack at −30°F. They can be cleaned with detergents, disinfectants, or steam. Color of finished relining is light gray.

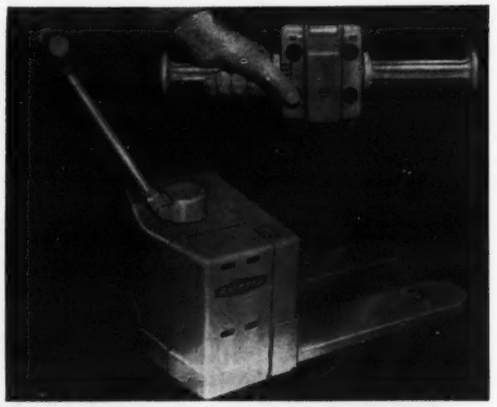
A vinyl plastic coating is used for the partial or patch jobs, while a polyester-type resin is used for complete reline work. Both are packed in containers of 5- and 55-gal capacities. A heavier reinforcing cloth is used for the complete reline. Both types of cloth are furnished in 100-foot rolls.

(Reliner materials are available from Archer-Daniels-Midland Co., 700 Investors Bldg., Dept. CP, Minneapolis 2, Minn. . . . or for more information check 7038 on form opposite last page.)

Operation on automotive batteries reduces overall length

Uses: For in-plant handling of palletized materials. Unit handles weights up to two tons.

Features: Power pack consisting of four automotive batteries provides 24-volt operation with no resistance loss in second and third speeds. Energy in four automotive batteries will equal that of single industrial battery. Four batteries can be



Use of automotive batteries permits overall length reduction

charged at the same time without being removed from chassis. Redesign of battery compartment permits overall length reduction to only 20½ inches plus load length.

Description: Unit has three travel speeds, finger tip control for travel, lift, and lowering. Third speed affords extra power on dockboards and ramps or for riding on long distance hauls.

(Operator-led truck is manufactured by The Raymond Corp., Dept. CP, 58-139 Madison St., Greene, N. Y. . . . or for more information check 7039 on form opposite last page.)

Can a Towmotor Solve My Handling Problems?

YES! **Towmotor Fork Lift Trucks and Towmotor Job-Planned Accessories are "tailor-made" for your particular application *in many ways*. Soundly engineered by materials handling specialists, the Towmotor line includes 15 different models and more than 60 interchangeable attachments, for *every* handling need.**

Ask your nearest Towmotor Representative to show you what Towmotor equipment can do to speed your materials handling, cut man-hour costs and make maximum use of storage space! . . . or write for Certified Job Studies covering *your* industry. TOWMOTOR CORPORATION, Div. 2308, 1226 E. 152nd St., Cleveland 10, Ohio.

Read how a company in the Chemical Industry handles materials 500% faster than before.

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America's best-engineered fork lift truck

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A modern truck for modern plants

The **HydroLectric**

with most modern features

- 2 Drive Wheels instead of one
- 2 Braking Systems available instead of one
- 4 Wheel Stability instead of three
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Put these modern features to work for you, greater profit at no additional cost.

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THERE IS A TRUCK FOR EVERY PURPOSE TO HANDLE ANY KIND OF MATERIAL.

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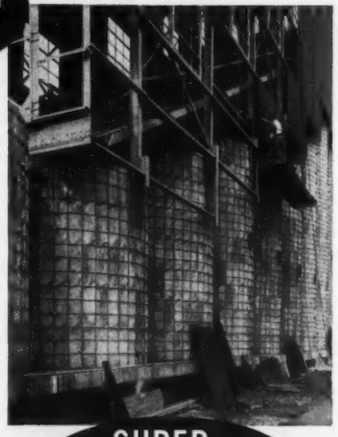
16 NEFF & FRY BINS IN THIS GROUP



These bins are used for handling silica sand. They range in size from 18′ dia. x 52½′ high to 12′ x 12½′. Machinery for screening and grading the sand is mounted directly on the bins without extra supports, proving the load-bearing strength of Neff & Fry construction.

Thousands of Neff & Fry Bins are being used for handling and storing nearly a hundred different kinds of bulk materials, including grain, coal, seeds, minerals, chemicals, clay, wood chips, etc.

Before you decide on storage bins, ask us for complete information. Read our folder, "Bins With the Strength of Pillars." Our bins will likely save you money on first cost, and certainly on maintenance.

SUPER-CONCRETE STAVE STORAGE BINS

NOT EXPORTED EXCEPT TO CANADA AND MEXICO.

The Neff & Fry Co. • 166 Elm St. • Camden, Ohio

When inquiring check 7042 opposite last page

Runs at temperatures to 350°F, designed for I- or T-beams . . .

sealed wheel bearings are pre-greased at factory.

Uses: Equipment is designed for conveyor applications such as ovens, spray booths, dip tanks.

Features: Ball bearing wheels are grease packed at factory. Units are capable of operating at temperatures as high as 350°F.

Description: Designed for use on either three-inch I-beam or 2½ x 2½ x ½″ T-beam, trolleys are spaced on 8, 12, 16 or 24″ centers. Trolley capacities range from 80 to 160 lb and can be doubled by use of load bars.

Trolleys are spaced on 8, 12, 16 or 24" centers

Vertical curves of track can be furnished to requirements, ranging from 3½′ radius, up. Horizontal turns are made around traction wheels of either 23″ or 30⅝″ diameter and are available in 45°, 90°, and 180° turns.

(Chain-O-Flex trolley conveyors are manufactured by Chain-O-Flex Corporation, Dept. CP, 3334 Lincoln Ave., Franklin Park, Ill. . . . or for more information check 7043 on form opposite last page.)

How to figure costs for plant trucks

Four-page illustrated reprint sets forth practical methods for figuring costs of gas or electric industrial trucks in the plant.

"How to Figure Truck Costs" is issued by The Elwell-Parker Electric Co., Dept. CP, 4205 St. Clair Ave., Cleveland 3, Ohio. When inquiring specify 7044 on form which is located opposite last page.

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THAT SOLVES TROUBLESOME BULK HANDLING PROBLEMS:

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Tubular and Pivoted Bucket Conveyors

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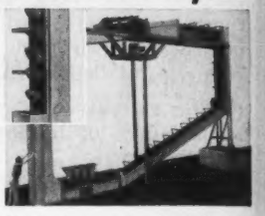

Exclusive top loading device on Pivoted Bucket Carrier handles fragile materials gently. Many other unique advantages.

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When inquiring check 7045 opposite last page

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World's largest producer of Fiberglass reinforced resin Trays, Tote Boxes

LINESVILLE, PENNSYLVANIA

When inquiring check 7046 opposite last page

Our Growing Industry

(Continued from page 20)

Diversification—source of stability

. . . and growth of Glidden Company — and others as Du Pont, Eastman, Dow — keynotes Glidden's more than $15 million expansion program during 1956. Already one of four largest paint manufacturers in the world, plus a major factor in edible oils, pigments, soybean processing, Glidden plans substantial increases in paint manufacturing capacity.

Possibly a new paint plant — at St. Louis — plus new or additional paint facilities at Atlanta, Montreal, other locations, are part of the picture.

Also . . . new titanium dioxide plant in Baltimore will involve $8 million. Terminal grain elevator in Chicago's Calumet Port area — already booming because of St. Lawrence Seaway legislation — cost $6 million.

Results of expansion program. . . new Adrian Joyce Works in Baltimore will double Glidden's present capacity for production of titanium dioxide from titanium slags and ilmenite. Chicago grain elevator — capacity 6½ million bushels — will aid in upgrading basic products of soybean — meal and oil — and industrial-edible soybean derivatives.

Paint Division is expected to continue its production and sales increase, 125% since 1946 compared with 69% for the industry.

Celanese in Chile

. . . is pronounced "Celatino, S. A.," and that subsidiary is now about to build a three-million-pound-a-year acetate yarn plant near Valparaiso, Chile. Application has been approved and the plant will be operated by an affiliate company, Celanese Chilena, S. A.

Significance of the move is that it follows so closely on the heels of new financial and foreign exchange reforms in Chile. Celanese has been active in the Latin American area and has plants in Mexico, Columbia, and Venezuela. They are also connected with a carbon black plant now under construction in Brazil.

Doubling production of Teflon 6

. . . a tetrafluoroethylene resin powder for extrusion, due to industry interest in the material, has been announced by DuPont. This relatively expensive plastic is used for making hose and tapes of electrical insulation and for insulating wire and cable.

First produced last Fall, potential has increased to the point where an expansion of manufacturing activities is necessary, says **William A. Franta,** DuPont's Teflon market manager."

Navy "superfuel"

. . . reported in this issue ("Suspicions are growing") is in for a substantial plant of its own. Callery Chemical Company, a wholly owned subsidiary of Mine Safety Appliances, has been awarded a cost without fee contract to erect an (estimated) $38 million plant to make the secret fuel.

Site will be in the Southwest "because of the availability of economical power and gas, the abundance of good water, and favorable transportation costs on raw materials."

Reports definitely peg the fuel as belonging to the "missile and aircraft" variety.

Uranium plants

. . . three new ones, will be erected by Catalytic Construction for Union Carbide Nuclear Company. This is a division of Union Carbide and Carbon. Locale for the new plants is so isolated that Catalytic Construction will have to put up base camps from which to build. Actual place names are Slick Rock, Colorado and San Miguel, Utah. Largest unit will go in near Rifle, Colorado. Operation is slated for 1957.

First western urea

. . . will be produced in a 100 ton per day plant now abuilding near Ventura, California. M. W. Kellogg is doing the construction for Shell Chemical. It will be the first U. S. plant to use the Montecatini process.

Raw materials will come from Shell's 150 ton per day ammonia plant located nearby. They will be piped into the new plant.

Eastman adds new fiber

. . . to its already established line of cellulose acetate and filament yarns. Called Verel, the new material is a modified acrylic currently being produced in staple fiber form in pilot plant quantities pending completion of additional facilities which are now under construction.

Verel will be of interest to the textile industry because of its many physical attributes such as ease of dyeing, natural white color, controlled shrinkage and chemical resistance. Material is also expected to be useful to makers of the so-called "man-made" furs.

Cumene from propylene

. . . and benzene — used as charging stock — is being produced at Hercules Powder Company, Gibbstown, N. J., unit under license from Universal Oil products. Cumene is then oxidized to make acetone and phenol for plastics and acetate rayon.

Foamed polyurethane slabs

. . . spewn out at rate of 22 pounds every minute are product of Dayton Rubber Company's new unit at Marietta, Ohio, plant. Annual production capacity is eight to ten million pounds, equivalent to 15 to 20 million pounds of latex foam rubber because of lighter weight. Uses are upholstery and cushioning, sponges, insulation. (See next page for use information.)

Spotlight on People

A fresh look

. . . at the chemical industry is taken by an investment counseling firm in a recent survey of theirs. General conclusions: 1) Chemical growth in the past ten years has been faster than general industry (production increase 72% vs 39%), 2) this growth has been healthy — readjustments in 1949 and 1954 had less effect on chemicals than on other lines and recovery was faster, 3) chemical industry is growing faster than its principal customers because of products research and improvements.

A limited number of copies of this survey (Issue 3, May 14, 1956, pp 125-202) are available. In addition to general aspects survey examines 29 chemical companies in some detail. For a copy (while they last) write Arnold Bernhard & Co., Inc., Dept. CB, 5 E. 44th St., New York 17, N. Y. . . . or check 7047 opposite last page.

Using Urethane

With all that has been said and written about urethane foam recently, people who have not appraised it first-hand may wonder what all the fuss is about. To answer their question, Mobay Chemical has printed a 20-page designer's notebook.

Done in color, this book suggests several practical uses for urethane by means of sketches. Resistance of the foam to heat and flame, for example, is illustrated pointedly in designs for ironing board covers, kitchen range insulation.

Design data given: Urethane will support up to twice the weight of latex foam, does not fatigue from flexing, and will stretch to twice its length.

For a copy of "An Adventure in Profits," write Mobay Chemical Company, Dept. CB, 1901 S. Second Street, St. Louis 4, Mo. . . . or check 7048 opposite last page.

Olin Mathieson has realigned its sales management structure in the industrial chemicals division . . . **Kenneth C. Frazier** is appointed manager, general products sales, **Derek Richardson** is manager, field sales activities with **O. J. Theobald Jr.**, assistant manager, and **Cecil L. Williamson** is manager of all divisional activities pertaining to accounting, treasury, budgets and financial analysis. **Laurence E. Russell** is manager of sales development.

Harold F. Shattuck is new eastern technical manger for Monsanto's organic chemicals division. His responsibilities will include counselling and assisting eastern sales reps on matters relating to the chemistry of Monsanto's products.

Reichhold names four new v-p's . . . **Dr. Fred A. Jolles, Herbert R. Helbig, George C. Sweet,** and **Sam Gurley Jr.**

And American Alcolac announces the appointment of **Carl Pacifico** to the position of vice-president.

Promotions at National Aniline's Moundsville, W. Va., plant . . . **C. L. Martin** is new superintendent of services, **Robert L. Axtell** is superintendent of production, **L. W. Jarrett** is superintendent of personnel and safety, while **H. A. Hammond** is new general foreman. And **Arthur T. Schramm** succeeds **Frank W. Green** who retires as manager, certified colors, for National Aniline.

Bruce K. Brown is named president of Petroleum Chemicals, Inc., jointly owned operation of Continental Oil and Cities Service Co.

Food Machinery announces the election of **Paul L. Davies** to post of board chairman and chief executive officer while **Ernest Hart** is new president. **John D. Crummey,** previously board chairman, is elected honorary chairman. **Alfred T. Loeffler** is elected v-p, **Dr. Carl F. Prutton** is named executive v-p in charge of chemical divisions, **James M. Hait** and **John D. Fennebresque** are named executive v-p's and **Jack M. Pope** is new financial v-p.

And at FMC's chemical divisions . . . **S. Philip Marcus** is named business manager of the new Princeton research center. Also on the center's staff . . . **Dr. O. C. Karkalits** is process and economic appraisal supervisor, **John E. Zarembo** becomes supervisor of general analytical services and **John P. Alden** is named technical information service supervisor.

Dr. Chris C. Schulze is appointed manager of manufacturing of the dyestuff and chemical division of General Aniline and Film while **Joseph W. Conlon** is named manager of the company's Rensselaer, N. Y. plant.

Arvon L. Davies is elected managing director of Chemstrand Limited, subsidiary of The Chemstrand Corporation.

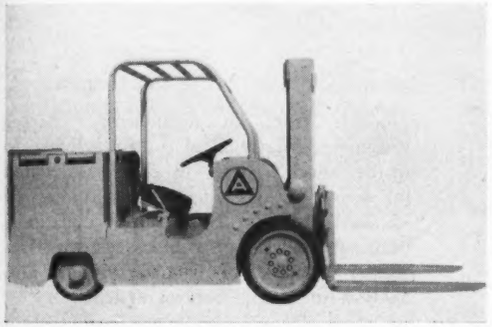
Robert S. Ray and **Jack Tielrooy,** both recently elected v-p's at Brea Chemicals, have been named to the company's board of directors and executive committee.

Robert U. Haslanger succeeds **Kenneth G. Donald** as president of Escambia Bay Chemical while **Dr. N. C. Robertson** is appointed new v-p.

'Low profile' design keeps driver's head below mast height

With mast height of 68 inches, "low profile" truck is designed for operating in and out of over-the-road trailers and through low-clearance doorways. Line of electric trucks is designed so that height of operator's head does not exceed mast height of truck, thus minimizing hazards resulting from low overhead clearances.

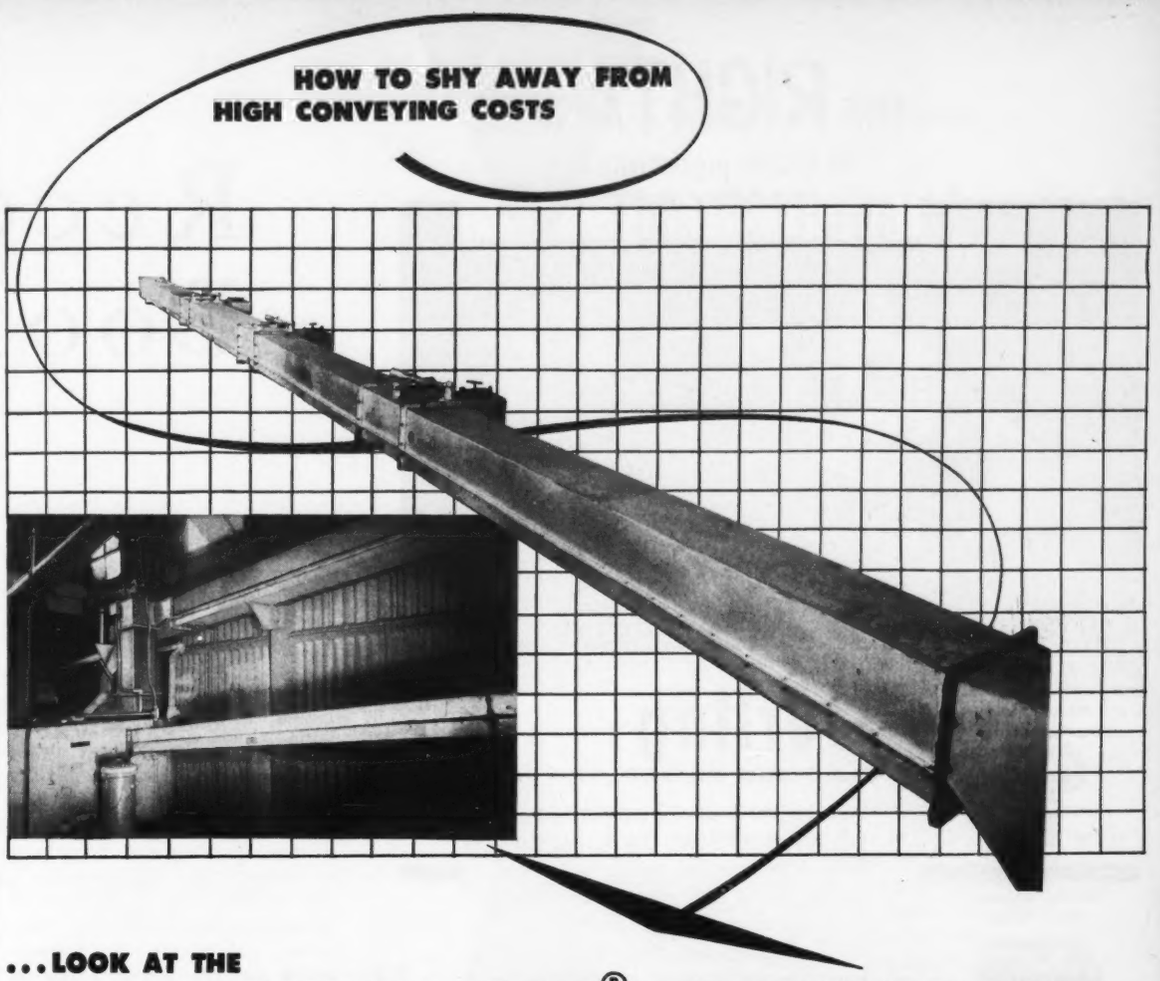
Trucks range in capacity from two to three tons and can accommodate standard size battery without



Truck is designed for low head-room operation — operator's head does not exceed height of mast

changing seat height of 24 inches and without having to resort to non-standard battery layout.

(ELF truck series is manufactured by Automatic Transportation Company, Division of Yale & Towne Mfg. Co., Dept. CP, 149 W. 87th St., Chicago, Ill. . . . or for more information check 7049 on form opposite last page.)



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The simplicity and noiseless ease with which the F-H Airslide fluidizing conveyor conveys alumina, phosphate, cement, flour, filler dust, and many other dry, fine materials are being enjoyed in a great number of plants in many industries.

The Airslide's record for low maintenance, high-volume conveying is outstanding wherever it is used . . . benefits in operation and in maintenance are constant and substantial.

In operation, low-pressure air is introduced into the material, through a porous fabric, from a lower section, causing the material to literally flow in a fluidized state through the upper section of the Airslide, installed on an incline, the degree of slope depending upon the material to be conveyed.

The Airslide can be used singly or in combination with other Fuller air-conveying systems, such as the Airveyor® or Fuller-Kinyon system.

If your operation involves the conveying of dry, fine material, take the simple step of consulting Fuller. Fuller engineers can show you, as they have others, how the F-H Airslide can "carry the load" in a way you never thought possible. For details of the Airslide write us for descriptive literature.

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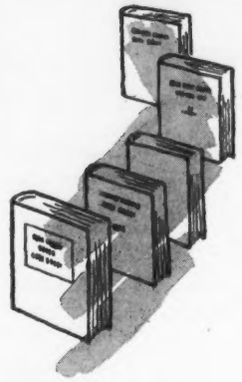
Recent Books



1954 Vacuum Symposium Transactions

Chemists, physicists, and engineers in the pharmaceutical, metallurgical, plastics, electronics, nucleonics, food, and other industries that employ vacuum processes will welcome "1954 Vacuum Symposium Transactions." The 147-page book with double columns presents nine papers in the field of new equipment and instrumentation, six in methods and techniques for obtaining high vacuum, nine in developments in fundamental vacuum technology, nine in applications and processes for vacuum systems, and a particularly helpful one that is devoted to standards and nomenclature.

Each paper is preceded by a brief abstract; many are followed by references to the literature. Book, well-illustrated with photographs, plots, cross-sectional views, and isometric drawings, is attractively printed on heavy paper. Page size is 8½ x 11 inches.

To obtain "1954 Vacuum Symposium Transactions" remit $10 direct to Committee on Vacuum Techniques, Inc., Dept. CP, Box 1282, Boston 9, Mass. When inquiring specify 7052 on form which is located opposite last page.

Automatic Process Control for Chemical Engineers

Dissatisfied with the solely descriptive approach employed in courses in instrumentation, Dr. Norman H. Ceaglske, professor of chemical engineering at the University of Minnesota, presents the basic theory of automatic control in his 228-page book. He proceeds from an introductory chapter through a description of control systems, to mathematical analyses in chapters devoted to derivation of equations, solutions by standard methods of differential equations, transient analysis of control systems, frequency response of control systems, and analysis of simple control systems.

Designed for those who are well-prepared in mathematics, the book contains 125 figures, 97 problems, and 45 references. A glossary of terms completes the volume.

To obtain "Automatic Process Control for Chemical Engineers" remit $6.75 direct to John Wiley & Sons, Inc., Dept. CP, 440 Fourth Ave., New York 16, N. Y. When inquiring specify 7053 on form opposite last page.

The Chemical Process Industries — 2nd Edition

The second edition of "The Chemical Process Industries" — first edition appeared in 1945 — should serve as a convenient reference to methods used in the manufacture of chemicals and chemical products. The new edition contains up-to-date information, illustrations, and flow diagrams on the various chemical industries.

As pointed out in the book's preface by the author, R. Norris Shreve, many flow sheets have been corrected, some only in a minor way. Obsolete ones have been discarded and new ones added. New references have been added. Many of the older ones have been dropped.

Each of the chemical process industries is analyzed and described by flow diagrams.

reviews of current technical and reference work . . . summarized for you by authorities in the field working with the CP staff

Important factors such as data on chemical and physical changes and reactions, economic statistics and costs, energy and power required, etc., are covered. Where figures are available, quantities of materials required to produce the finished product are listed.

Wide in scope, the 1004-page volume covers the manufacture of chemicals themselves, and includes full description of many manufacturing industries based on important chemical changes, such as making of plastics, synthetic fibers, ceramics, paints, explosives (including atomic bombs), and pesticides. Appendix includes problems arranged by chapter headings.

To obtain "The Chemical Process Industries" remit $11.50 *direct to the McGraw-Hill Book Company, Inc.,* 330 *West* 42*nd Street, New York* 36, *New York.*

Handbook of Barrel Finishing

Tumble grinding in barrels to remove scale and sand from castings and to rough-finish metal parts has developed to the point where selective deburring, microfinishing, burnishing, coloring, and edge-rounding are rapid and economical. Ralph F. Enyedy, of the Westinghouse Electric Corporation, deals with economies and room layout for barrel finishing, finishing compounds, barrel types, auxiliary equipment, cleaning with sawdust, self-tumbling, barrel tumbling with chips, polishing and burnishing in barrels, and with many other pertinent aspects in 255 pages. Of these, 197 are full-page specification sheets that cover sketches of the pieces to be finished and state steps, barrel types and speeds, chip types and loads, compound types and amounts, water levels, number of parts per load, and tumble times.

Forty-nine line cuts and photographs distributed through these 7 x 10-inch pages supplement considerable information that appears for the first time in book form. No index is provided; some trivial inconsistencies in manuscript editing were noticed.

To obtain "Handbook of Barrel Finishing" remit $7.50 *direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y.*

Modern Chemical Processes Volume 4

The fourth volume (202 pages) in a series of books describing chemical manufacturing processes follows the same factual pattern of its predecessors. Nineteen chemical processes, all in operation on a full-scale production level, are described in detail.

Included in the book are the following processes: Stengel process ammonium nitrate, portland cement production, graphite electrodes, chlorophyll by solvent extraction, nitrofurans, malting, alumina, allethrin, calcium magnesium aconitate, salt manufacture, aluminum, p-xylene from petroleum, specialty soaps, anthraquinone vat dyes, ammonia-base sulfite pulping, resin and paint production, vitamin B_{12} feed supplement, French synthetic detergents from petroleum, and vegetable oil refining.

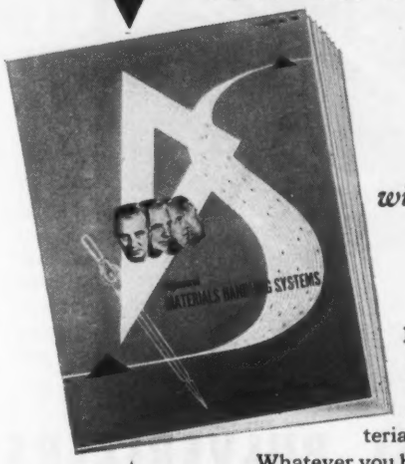
Each process description includes background, description of plant installation, description of process and operation of plant, economics, personnel, and future prospects.

To obtain "Modern Chemical Processes — Volume 4" remit $5 *direct to Reinhold Publishing Corporation, 430 Park Avenue, New York 22, New York.*

FREE! *to executives . . . engineers . . . supervisors*

This 32 Page Idea Book on Materials Handling

will spark your thinking



Need a system to lower ¾-ton newsprint rolls . . . or to handle sheet steel . . . or bulk chemicals, coal, textiles, grain, foundry materials—almost anything at all?

Whatever you have to move . . . and whatever the direction—up, down, or horizontal—you'll find lots of answers in this factual, fully-illustrated book. It's crammed with photos, engineering drawings, basic information about a broad range of materials handling problems.

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You'll read of the can manufacturer who needed a system which would automatically feed, lower and discharge 2500-lb. bundles of sheet steel—and installed a G-W system which resulted in 87% savings in handling time.

But these cases are just two among hundreds which G-W has solved.

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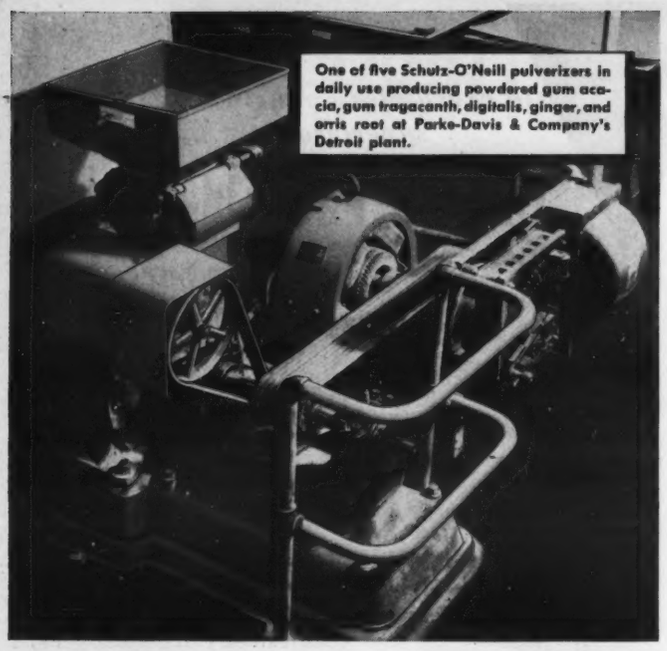

One of five Schutz-O'Neill pulverizers in daily use producing powdered gum acacia, gum tragacanth, digitalis, ginger, and orris root at Parke-Davis & Company's Detroit plant.

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The name Parke-Davis & Company is known worldwide as a leading pharmaceutical manufacturer. For over fifty years Schutz-O'Neill pulverizers have played a dominant part in this well earned reputation in the production of highest quality products that meet the most rigid standards.

Manufacturers of food, chemical, drug and mineral products have depended on Schutz-O'Neill pulverizers for over 65 years. In all parts of the world Schutz-O'Neill pulverizers are in daily operation preparing materials ranging from microfine powdered sugar in the food industries, to borax in the mineral industries.

Versatility for production of medium-coarse, fine and microfine powders have made them the choice for milling superior powders from such materials as specialty grain fractions, cocoa powder, aspirin, saccharin, ultrafine diatomaceous earth, limestones and phosphates, urea melamine and phenolic plastic moulding powders, and herbs, barks, roots and seeds of all types.

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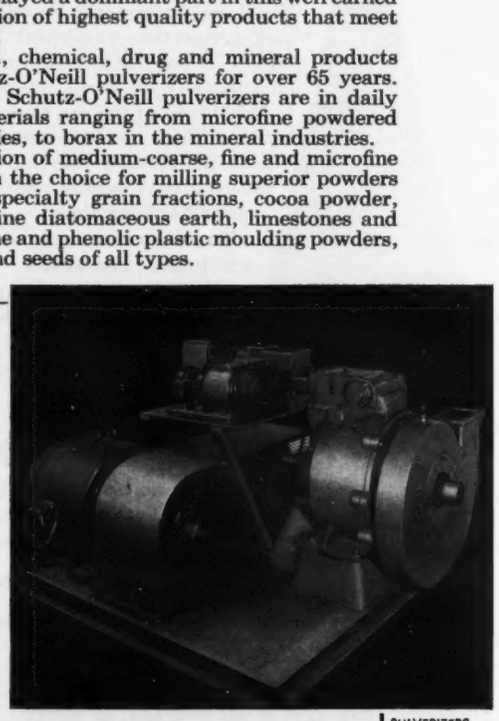
now available in sizes ranging from 7½ to 125 horsepower with grinding chambers 12" to 28" in diameter.



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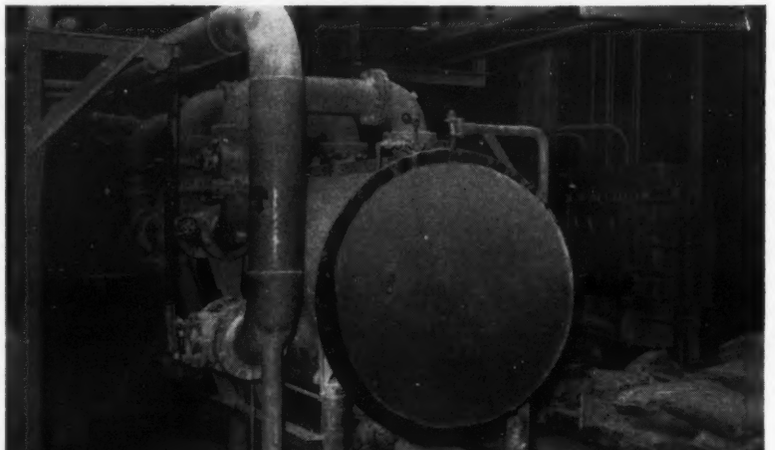
What can a good process water filtration system do? Wyandotte Chemicals replaces sand filters with two compact diatomite units and not only improves an already USP-grade product, but also . . .

filters million gal water per day in 108 sq ft floor space

TED F. MEINHOLD, Assistant Editor
With **J. F. McANULTY,** Manager of Process Engineering
Wyandotte Chemicals Corporation

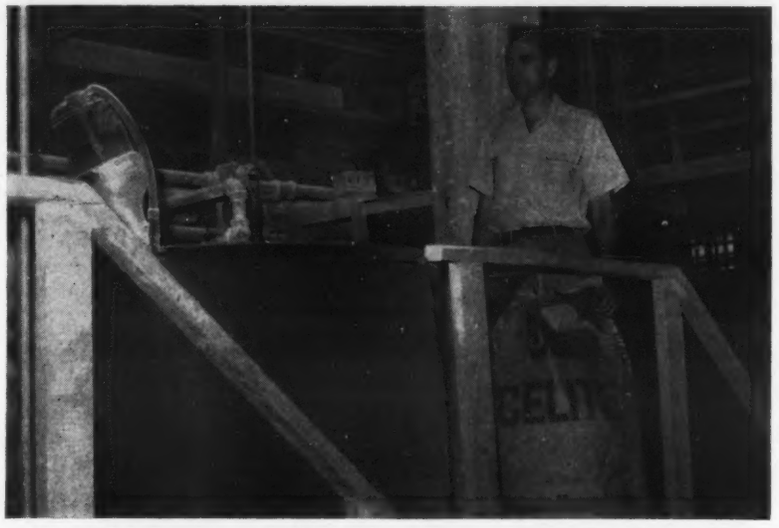


One of the two diatomite filters at Wyandotte Chemicals Corporation. Other unit is located directly behind this one

Problem: Research at Wyandotte Chemicals Corporation, Wyandotte, Michigan, showed that company could further improve the quality of its already USP-grade calcium carbonate, if they found some way of removing the minute percentage of suspended particles present in their process water. The water, obtained from the Detroit River, was sand-filtered prior to use in the manufacturing process. Turbidity of the raw river water varies from a maximum of 700 ppm to minimum of five ppm. Average turbidity during summer months is about 25 ppm. In winter it goes up to about 60 ppm.

Solution: Sand filters were replaced by two diatomite water filters. Units are of the horizontal-tank type, each having filtration area of 400 sq ft. Filter elements consist of disc-shaped plates mounted in vertical position on a hollow center shaft. Discs are constructed of a rigid, corrosion-resistant base covered with orlon cloth. Cloth is stitched at outer edge and sealed to prevent by-pass. Filter's center shaft is made of rubber-dipped mild steel. Tank is rubber-lined and has a removable head. Floor space required for each filter is 9 x 6′.

Filter aid used is Celite 503, a fairly coarse grade of diatomaceous earth. Slurry is prepared (one lb Celite per lb water) in



Filter aid slurry is prepared in 380-gal tank and is fed continuously into main water line

a 380-gal tank and is fed continuously into the water stream to maintain a porous cake. Slurry is added at rate of about 0.7 lb per 1000 gal. A diaphragm-pump is used to meter the slurry.

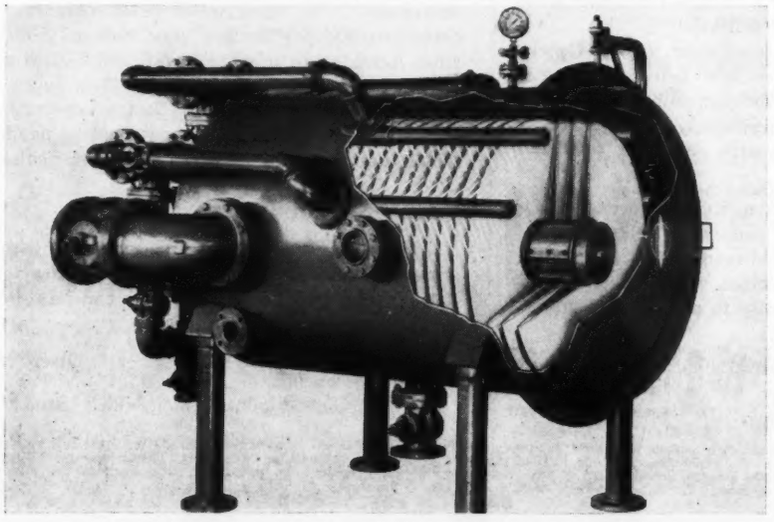
Filters have built-in jet sprays for fast, efficient cleaning. Cleaning may be accomplished by jet spray action alone — or by combination backwash and jet spray. Unit can be cleaned and flushed out with only about 1000 gal of water in approximately five minutes. Design is such that filters may be completely disassembled and reassembled by one man without special tools in only a few hours.

Results: Through the use of diatomaceous earth filtration, Wyandotte Chemicals have further improved their product and now has available a million-gal-per-day supply of sparkling clear, turbidity-free water. Although rate of filtration varies with water demand, the average rate is about 200 gpm per filter. Units have been operated at 400 gpm for test purposes, but this is considered to be top capacity.

Based on the average turbidity, initial filtration cycles were somewhat shorter than

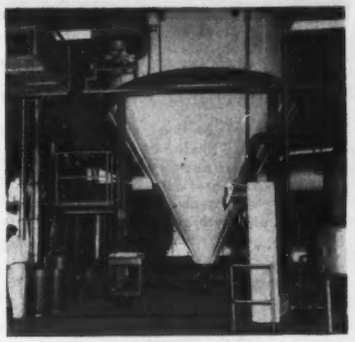
(*Please turn to page* 125)

Cutaway view of filter shows interior. Built-in jet sprays provide self-cleaning action



Custom Drying ...Test Runs

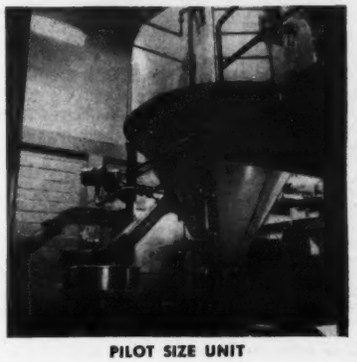
NERCO NIRO® Spray Dryers



COMMERCIAL UNIT

To meet your requirements for large tonnage custom spray drying, small and large scale test runs and batch testing, Nerco-Niro offers, at Netcong, New Jersey, the most completely equipped facility of its kind. Drying equipment includes:

1. 32" diameter laboratory unit.
2. 7'-6" diameter pilot size unit.
3. 16'-0" diameter commercial size unit.



PILOT SIZE UNIT

Our plant incorporates:

- Expert engineering supervision
- Process steam throughout the plant
- Jacketed feed pipes
- All stainless-steel equipment
- A large warehouse
- Railroad and truck sidings
- Modern materials handling equipment

We invite you to take advantage of the great savings in expense, time and labor that are possible through using this Nerco-Niro service.

Write for Bulletin No. 232 for a more detailed description.

For more information return the coupon below.

Nichols Engineering & Research Corp.
Nerco-Niro Spray Dryer Div.
70 PINE ST., NEW YORK 5, N. Y.
Laboratories: Netcong, New Jersey

Nichols Engineering & Research Corp. - Nerco-Niro Div.
70 Pine Street, New York 5, N. Y.

Please send me more information on your spray drying laboratory services.

NAME_____ TITLE_____

CO. NAME_____

STREET_____

CITY_____ ZONE____ STATE_____

When inquiring check 7056 opposite last page

"NATIONAL" PROVIDES THE *Economical Solution* TO *Any Drying Problem!*

No matter what your product may be, it can be dried or otherwise processed at a lower cost per pound or other unit, in one or more of the various types of "NATIONAL" equipment.

High-speed production; maximum effective use of the drying medium under finely adjusted control; adaptability to existing plant conditions and future expansion; and the assurance of long, trouble-free operation are among the important reasons why "NATIONAL" machines are being erected in more and more chemical plants throughout the United States and in other countries.

NEW "P-4" CONSTRUCTION

The result of a radically new approach to simplified Dryer construction, "P-4" Construction provides a precision-built, prefabricated structure, with trussed-and-tensioned insulated panels. It assures a more rigid, durable machine, with installation time in your plant reduced as much as 50%.

"ADD-A-UNIT" DESIGN

This unique accomplishment of "NATIONAL" engineering provides alternatives which are both practical and economical — (1) simplification of the initial installation based on present requirements; (2) maximum adaptability to step-by-step future expansion.

OTHER SPECIAL FEATURES

Patented Super-Power Fans, made in our own shops to specifications developed through years of industrial drying experience. Patented Indexing Orifices, Turning Vanes and other devices and arrangements assure unequalled versatility and precision in air distribution and control. The heat source may be steam, gas, oil or other medium.

●

Single and Multiple Conveyor Dryers; Cabinet and Tunnel Type Truck Dryers; Extruders; Drying and Baking Ovens; Equipment for Plastic Film and other Continuous Web Processing; Test Dryers.

Right: Large Multiple-Unit, Multiple Apron Conveyor Dryer.

Below: Fourteen-Section Multiple-Unit Single-Apron Conveyor Dryer With Three-Zone Control.

Write for Complete Information

THE NATIONAL DRYING MACHINERY CO.
LEHIGH AVENUE and HANCOCK STREET
PHILADELPHIA 33, PENNA.

New England Agent: JONES & HUNT, INC., Gloucester, Mass.
Cable Address: "NADRYMA" — W. U. Code

When inquiring check 7057 opposite last page

The editors explain

Why no subscription charge for CHEMICAL PROCESSING?

DEAR READER:

Yes, that's right . . . there's no subscription price for CHEMICAL PROCESSING . . . *if* you are responsible for processing operations in the chemical and allied fields.

How can this be? Why?

Well, first let's look at a few facts of business magazine publishing:

1. A magazine such as this must serve *only* a highly specialized group of men . . . like yourself.
2. But you men . . . limited to thousands among the millions of people in the USA . . . are scattered all over the country. And you're *hard men to get to.*
3. Moreover, many of you simply can't be reached at reasonable cost . . . so it's tremendously expensive to try to sell you a subscription . . . *and* too many of you important folks do not subscribe no matter what efforts are made to sell you.

SO . . . it's actually more efficient to "hand-pick" you key processing men and deliver CHEMICAL PROCESSING to you without demanding payment of subscription.* (And, surprisingly, this method of building circulation actually costs the publisher less!)

Most important — the method assures CP far better coverage of key processing folks . . . and so it serves more "desired readers" . . . and so the advertising is more effective. (An "effectiveness" proven by reader response to articles and advertisements in each issue.)

For, you see, an industrial magazine lives from the advertising dollars it takes in . . . not from subscription dollars. In fact, most paid-subscription industrial magazines spend more on selling subscriptions than they get back in subscription dollars!!!!!

Then why do some publishers keep on trying to sell subscriptions?

Well, there's an old postal law — passed way back in 1879, long before "controlled", "no-subscription-price" circulation methods were known — which still gives a low postage rate to paid-circulation magazines. Some publishers still feel this "postal subsidy" is necessary.

We differ . . . we believe it is more important to give greater service to more processing folks than it is to save on postage. (After all, it is effective advertising that pays the bills . . . not subscriptions. By serving more "desired readers", we give greater advertising values.)

Moreover . . . *no* subscription price within reason could possible pay for any good industrial magazine. Actually, to prepare, print, and mail a good industrial magazine costs $20 to $40 or more per year for each reader served. So, you see, a subscription price is no more than a token payment which qualifies some magazines for postal subsidy.

So . . . that's why —

. . . that's why you receive this magazine without subscription charge. Doesn't it make sense to do it the way more processing people can be served? . . . and served better?

THE EDITORS

*As CP renders a public service, men outside the orbit of the special field served may buy CP at "$1.00 the copy" or "$10.00 the year." Such paid subscriptions are few in number . . . they are not included as "chemical processing" circulation on BPA Audit Reports.

NOTE: General or "mass" magazines do not have this problem of "hand-picking" special readers. They simply serve "people" as "people". So paid circulation methods are practicable for them.

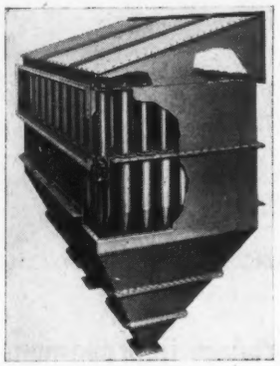
Aerodynamically shaped vanes increase dust collector's efficiency . . .

provide faster and smoother gas flow with a minimum of turbulence

Uses: Removing dust and suspended particles from exhaust gases.

Features: Aerodynamically shaped vanes on collector tubes are said to result in greater collection efficiency and gas flow per given pressure drop than has previously been obtainable in multiple-tube collectors.

Description: Collector consists essentially of a series of cyclone tubes arranged in parallel inside a steel housing. Dust-laden gases enter unit under pressure through lower set of inlet tubes. Aerodynamically shaped vanes at mouth of tubes set up fast circular motion in gas, causing suspended particles to be forced downward and outward against wall of collector tube.



Dust-laden gases enter collector through lower set of inlet tubes. Clean gases are forced up through outlet tubes — dust dropping into hopper at bottom of collection unit

"Drop out" and collection efficiency increase as centrifugal force increases. Vanes provide faster, smoother gas flow with minimum gas turbulence.

Cleaned gas is forced upward into smaller diameter outlet tubes — passing through another set of vanes located just below outlet tubes. Vanes boost capacity of outlet tubes — resulting in use of fewer tubes per unit and lower total cost for given capacity and efficiency.

(Cyclo-trell multiple tube dust collectors are product of Research-Cottrell, Inc., Dept. CP, Bound Brook, N. J. Check 7058 opposite last page.)

Describes manufacturing facilities for high-pressure equipment

Manufacturing facilities for fabricating pressure vessels, high-pressure piping, and custom-designed weldments are described in illustrated 18-page brochure. Publication is spiral-bound.

Bul GS-56-4 is issued by Foster Wheeler Corp., Dept. CP, 165 Broadway, New York 6, N.Y. Specify 7059 opposite last page.

THIS compact mill system combines in *one* simultaneous process the functions of several different units. The result is a streamlined operation that saves floor space, simplifies plant layout, avoids rehandling materials and speeds up production.

In making finely ground limestone, bauxite, gypsum, non-metallic minerals, fillers and many special chemicals, the Raymond Whizzer-type Roller Mill gives close control of the finished product in fineness, dryness and uniformity. When the mill is equipped with Flash Drying accessories, a definite percentage of surface moisture may be removed while pulverizing.

You will find that Raymond Roller Mill economy is an important factor in your production. Ease of installation, low cost operation and maintenance, as well as pneumatic feed control which keeps a maximum "load" on the mill at all times, all add up to substantial savings that reduce your overall costs.

C-E

For further details, write for Raymond Catalog No. 79

SINCE 1887

COMBUSTION ENGINEERING, INC.
Raymond Division
1317 NORTH BRANCH ST.
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SALES OFFICES IN PRINCIPAL CITIES
Combustion Engineering-Superheater Ltd. Montreal, Canada

When inquiring check 7060 opposite last page

Sel-Rex **GERMANIUM RECTIFIERS**

give you

Dependable Power

top efficiency . . . up to 96% . . . for the life of the unit!

Where You Need It!

unaffected by corrosive atmospheres — can be installed alongside work

Completely sealed! Liquid cooled! Impervious to corrosive atmospheres! No costly "distant" installations . . . no bolting or alignment to bother with. Sel-Rex gives you more kilowatts of *maintenance-free power* per dollar invested. Single units 25 to 50,000 amperes — "custom engineered" to your specific requirements — all types of fully automatic and remote controls.

Write Dept. CP-8

NEMA

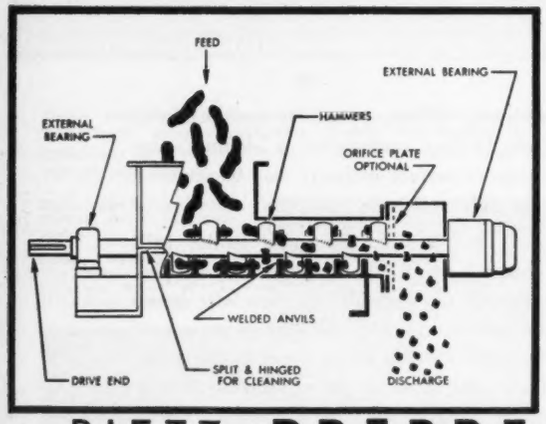
BART-MESSING CORPORATION

Sel-Rex Rectifier Division — 229 Main Street • Belleville 9, N. J.

Distributor Inquiries Invited

When inquiring check 7061 opposite last page

. . . . the answer to many problem jobs in



CRUSHING
HOGGING
GRINDING
of extremely large and/or tough materials

MIXING
BLENDING

RIETZ **PREBREAKERS**

Models for Many Purposes

CAPACITIES: ½ to 60 Tons per Hour
MOTORS: 1 HP to 100 HP
SPEEDS: 10 RPM to 600 RPM

Rietz Prebreakers successfully replace equipment of much higher horsepower and function with lower maintenance cost.

Send your problem materials to Rietz for free testing on Rietz equipment. Processed samples and a full report will be returned to you.

ENGINEERING OFFICES IN PRINCIPAL CITIES

Rietz **MANUFACTURING CO.**

Santa Rosa, Calif. West Chester, Penn.

When inquiring check 7062 opposite last page

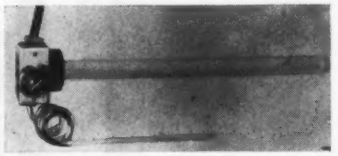
Built-in thermostat featured on corrosion-resistant immersion heater . . .

units come prewired, ready for use

Uses: Heating chemical solutions.

Features: Heaters have built-in thermostat, are prewired and ready to be connected into any available circuit.

Description: Fused quartz sheaths sensing bulb, providing high heat conductivity, good electrical insulation, and resistance to most corrosive acids. For cyanides



Immersion heater's temperature can be set by adjusting dial

and caustic solutions, sheath is made of stainless steel. Chemical-resistant perforated tubing for heater sheath is also available.

Maximum capacity of heater-thermostat is 6000 watts. Unit is equipped with dial control which may be set anywhere between 50° and 250°F. Other ranges are available upon request.

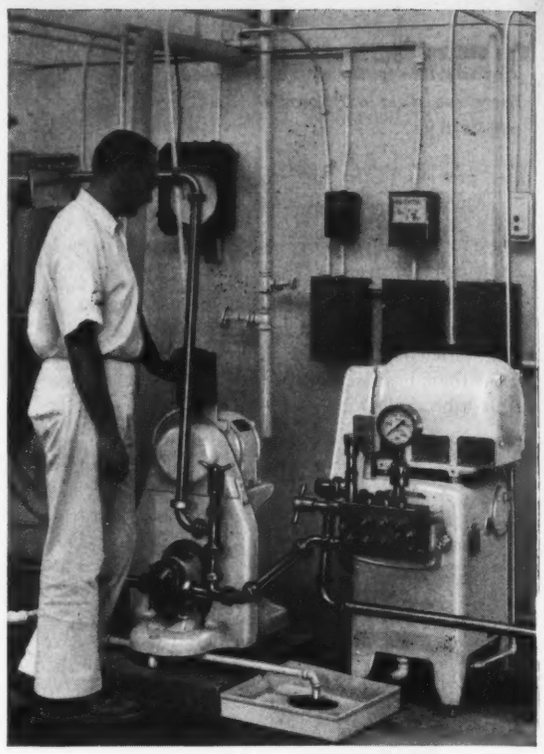
Bulb length is 12" and capillary tubing is 36" long. Worn-out elements can be quickly replaced.

(ThermX QT heater-thermostats are product of N. J. Thermex Co., Inc., Dept. CP, 533 Bergen Street, Harrison, N. J. Check 7063 opposite last page.)

Discusses gas plants

Single and double rectification plants for producing oxygen, nitrogen, and acetylene are described in 20-page catalog.

"Supairco Plants" is issued by Superior Air Products Co., Dept. CP, 132 Malvern St., Newark 5, N.J. Specify 7064 opposite last page.



How he makes product improvement a push-button operation!

When he presses the starter button he *knows* he's going to get the smooth consistency in his cosmetic cream that Lady Esther—and his customers—demand.

He knows because the shearing action of this Cherry-Burrell "Superhomo" homogenizing valve absolutely guarantees well dispersed, thoroughly mixed oil globules . . . and eliminates any chance of oil separation back into particles of unequal size and dispersion.

He knows he has the homogenizer he needs because of on-the-job results. If you wonder whether Cherry-Burrell "Superhomo's" high-speed shearing action will improve your product . . . just send us a sample. We'll be glad to give your product a complete test. No obligation, of course.

See your Cherry-Burrell Representative, or write for bulletin.

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427 West Randolph Street, Chicago 6, Illinois

Dairy • Food • Farm • Beverage • Brewing • Chemical • Equipment and Supplies

SALES AND SERVICE IN 58 CITIES — U.S. AND CANADA

When inquiring check 7065 opposite last page

Diatomite Filters

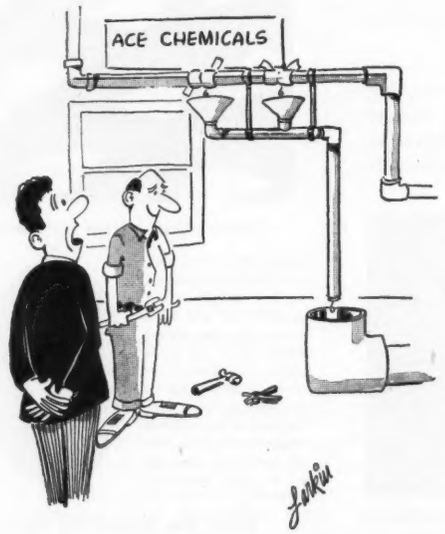
(*Continued from page* 121)

originally anticipated. This was believed to be due to the presence of algae or some other organic growth which does not show up in conventional turbidity measurements. Continuous addition of chlorine with the precoat slurry has eliminated this material. Filtration cycles now last from two to three days.

Actual operating costs, which are expected to drop as more experience is gained, are less than three cents per 1000 gal of water. This includes filter aid, precoat and body feed, and labor. Pumping and chlorine are not included, since these will vary widely with various installations.

(Celite 503 filter aid is product of Johns-Manville Products Corporation, Celite Division, Dept. CP, 22 East 40th Street, New York 16, New York . . . or for more information reader may simply check 7066 on the convenient Reader Service slip which is located opposite last page.)

(Model SCJ 40-25 diatomite filters are product of Sparkler Manufacturing Co., Dept. CP, Mundelein, Illinois . . . or for more information check 7067 on the convenient Reader Service slip which is located opposite last page.)



"Marvelous ingenuity, Hoskins, but I'm sure there's a more modern way to solve our corrosion problem."

MARLO HEAT TRANSFER EQUIPMENT

NOW AVAILABLE IN STAINLESS STEEL TO YOUR SPECIFICATIONS

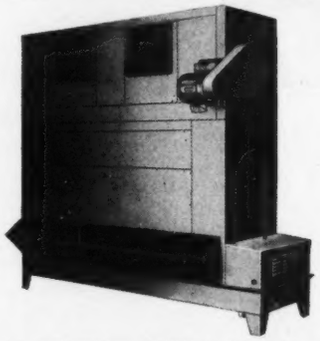
HEATING and COOLING COILS

Stainless—Continuous plate type with staggered tubes and smooth drawn ferrules pressure-expanded to produce a highly effective positive mechanical and thermal bond between tube and fin. Also available with copper and aluminum tubes and fins in any combination.

COOLING TOWERS

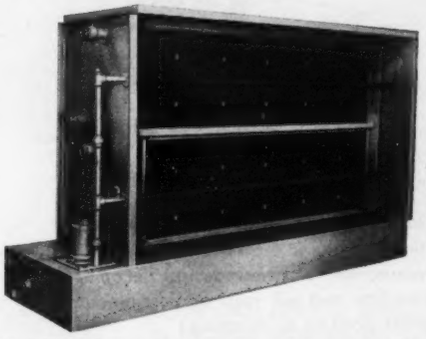
Stainless—2—150 tons. Suitable for indoor or outdoor location. Quiet operating.

EVAPORATIVE CONDENSERS



Stainless—3—150 tons. Suitable for indoor or outdoor location. Quiet operating. All prime surface condensing coil.

AIR WASHERS



Stainless—Compact and sectional in construction, for quick, easy erection. Available in many standard sizes, also custom designed for special applications.

For More Complete Information, Send Coupon Attached to Your Letterhead.

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coil co.

SAINT LOUIS 10, MISSOURI

Quality Air Conditioning and Heat Transfer Equipment Since 1925

MARLO COIL COMPANY

6133 Manchester Ave., St. Louis 10, Mo.

Please send me complete information on the following stainless steel Marlo heat transfer equipment.

☐ Heating and Cooling Coils ☐ Cooling Towers

☐ Evaporative Condensers ☐ Air Washers

NAME_____

COMPANY_____

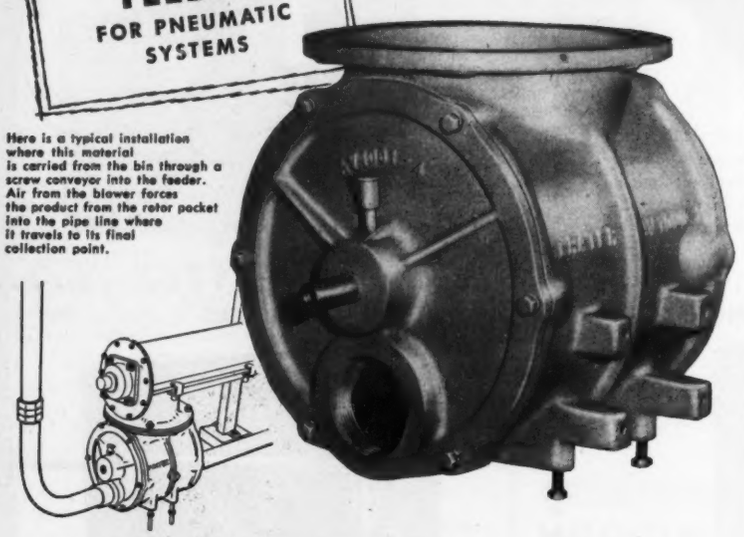
ADDRESS_____

CITY_____ ZONE____ STATE_____

When inquiring check 7068 opposite last page

NEW! FOR HANDLING FREE-FLOWING PRODUCTS

PRATER BLOW-THRU FEEDER
FOR PNEUMATIC SYSTEMS



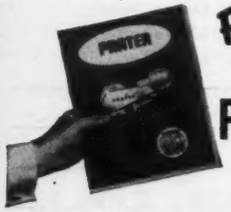
Here is a typical installation where this material is carried from the bin through a screw conveyor into the feeder. Air from the blower forces the product from the rotor pocket into the pipe line where it travels to its final collection point.

No matter how attritionized the product, this new Prater Blow-Thru Feeder will feed it efficiently and quickly into any pneumatic system. And this new design becomes an integrated part of the pipe line and will feed against pressures as high as 10 PSIG . . . either positive or negative!

One of the efficient design features of this unit is that on the horizontal center line of the body casing is a pressure neutralizing port to bring the rotor pockets to atmospheric pressure before filling.

There are many other interesting and high quality production features. Power requirements vary according to the fineness and abrasiveness of the product . . . flour, salt, carbon or any other material.

Available in cast iron and bronze . . . write today. Ask for our new airlock catalog, the most comprehensive in the industry!



FREE!

PRATER PULVERIZER COMPANY
1517 S. 55th Court
Cicero, Illinois

When inquiring check 7069 opposite last page

Vacuum molding bags are preformed and cured on mold . . .

method produces bag which holds its shape, lasts longer

Uses: Vacuum molding of reinforced plastic laminates.

Features: Bags can be preformed to virtually any contour. They are cured on the mold and are ready for use in a fraction of time formerly required. Method produces bag which is not only more inexpensive to make, but also one which holds it shape and lasts far longer.

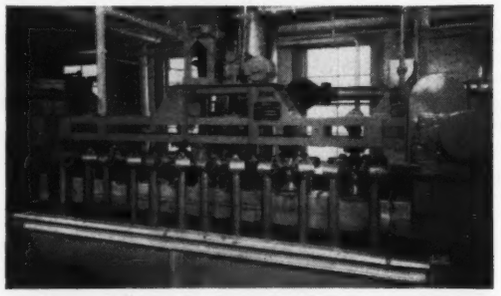
Description: Bags are made of special stock of high-grade rubber. To make bags, manufacturer asks that the specific mold be shipped to his plant. Where this is not practical, manufacturer's engineers will do the job at customer's plant. Finished bags will withstand 240 or 250°F. In case of tear, they can be repaired right on the job — for as little as the cost of a cold patch.

(Vacuum molding bags are product of Quaker Rubber Division, H. K. Porter Company, Inc., Dept. CP, Tacony & Comly Streets, Philadelphia 24, Pa. . . . or for more information check 7070 on the convenient Reader Service slip which is located opposite last page.)

Molded rubber-styrene filter elements on vacuum tube thickener . . .

machine designed to concentrate corrosive slurries

Using a special design of filter element, together with filter cloth and blow-back mechanism, vacuum tube thickener has been developed for concentrating corrosive slurries. Unit is said to be especially suitable



Vacuum tube thickener can handle corrosive slurries difficult to process on conventional equipment

for handling slurries hard to process on conventional filters, or those difficult to settle because solids are light and flocculent, and where elevated temperatures cause disturbing convection currents.

Machine has been used successfully on the following

PIPE LINE to a BETTER PRODUCT

FERROFILTER

Magnetic Separators

provide the positive method of extracting microscopic iron particles from liquids and slurries. A strong electromagnet magnetizes the grids which attract and remove from suspension even feebly magnetic particles. Models also available for finely ground dry materials.

Here's how iron collects

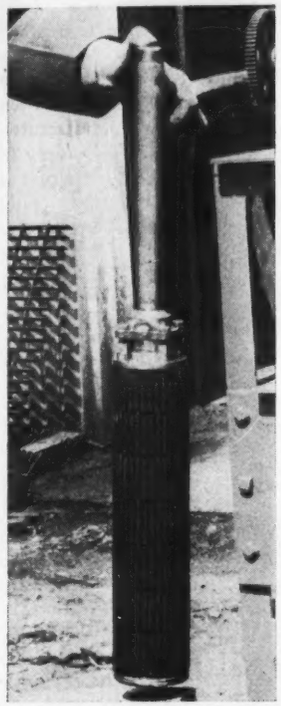
Those black ridges are iron particles clinging to the edges of a magnetized grid of a wet-type FerroFilter From 16 to 30 grids are in each FerroFilter dividing the liquid into thin elements, attracting and holding magnetic particles until current is shut off and the separator cleaned.

Send for BULLETIN 56-E

S. G. FRANTZ CO., INC.
Brunswick Pike and Kline Ave.
P. O. Box 1138 Trenton 6, N. J.

When inquiring check 7071 opposite last page

applications: clarification of crude citric acid, leach slurries for electrolytic zinc metal process, concentrating waste lime slurry from acetylene plants, and in various paper mill processes.



Filter elements consist of gear-like design sections mounted on stainless steel tube. In operation, elements are covered with filter fabric

Heart of thickener is the molded filter element sections. Made of synthetic rubber and a high-styrene resin (Goodrite Resin 50) supplied by B. F. Goodrich Chemical Company, the sections are of a gear-like design and are mounted on stainless steel (or plastic) tubes. Design provides support for exterior filter fabric covering while at the same time providing inner area channels for liquor flow-away. Pieces also have tongue-and-groove end sections, giving automatic alignment of the outside ribs as they are mounted on the tubes.

(EDCO vacuum tube thickener was developed by Equipment Development Company, Inc., Dept. CP, 363 Bloomfield Avenue, Montclair, New Jersey . . . or for more information reader may simply check 7072 on the convenient Reader Service slip which is located opposite last page.)

Technical, economic factors of electron-beam radiation

Use of electron accelerators in industrial processing is discussed in 34-page catalog. Technical and economic factors that must be considered in applying electron-beam radiation are presented. Photos, charts, and drawings are used to describe various models available. Space requirements, shielding, operation, and maintenance of electronic accelerators are also discussed.

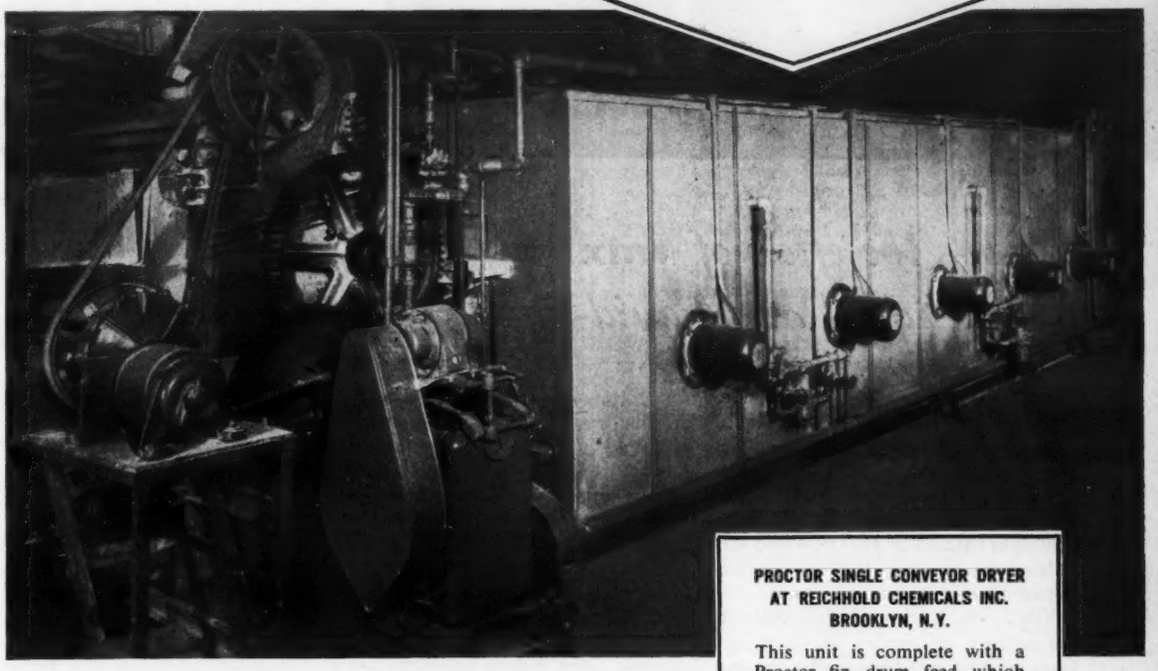
Bul E is issued by High Voltage Engineering Corp., Dept. CP, 7 University Rd., Cambridge 38, Mass. . . . or for more information about manufacturer's product, reader may simply check 7073 on form opposite last page.

IN EVERY INSTALLATION

Proctor **Drying Ranges**

offer:

Highest Drying Uniformity
Consistent Product Quality
More Profitable Operation



PROCTOR SINGLE CONVEYOR DRYER AT REICHHOLD CHEMICALS INC. BROOKLYN, N.Y.

This unit is complete with a Proctor fin drum feed which preforms pigment into sticks of uniform thickness and deposits them directly onto the conveyor dryer.

In every installation, Proctor Drying Ranges provide higher drying speeds resulting in increased yields, and profits. Proctor equipment offers the control and flexibility essential for uniform drying, insures consistent high product quality.

Many wet-solid materials heretofore considered unsuitable for conveyor drying can now be handled efficiently by means of Proctor pre-forming techniques. And, as always, Proctor equipment carries performance guarantees based on wide experience and careful analysis of the requirements. Write for complete information.

PROCTOR DRYING EQUIPMENT FOR FOOD AND PROCESS INDUSTRIES

Tray Dryers

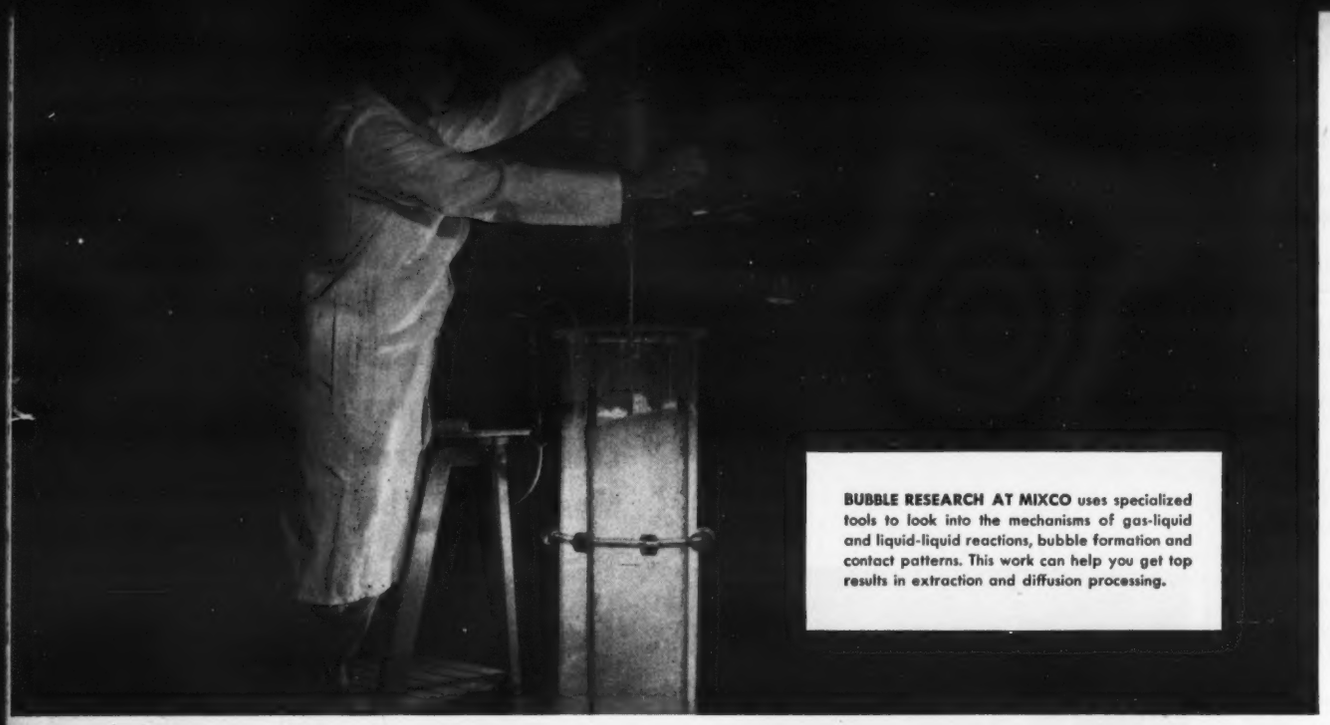
Truck Dryers **Pre-forming Feeds**

Spray Dryers

Proctor **PROCTOR & SCHWARTZ, INC.** Philadelphia 20, Pa.

Manufacturers of Industrial Drying Equipment and Textile Machinery

When inquiring check 7074 opposite last page



BUBBLE RESEARCH AT MIXCO uses specialized tools to look into the mechanisms of gas-liquid and liquid-liquid reactions, bubble formation and contact patterns. This work can help you get top results in extraction and diffusion processing.

What's the effect of **mixing** *in gas-liquid and liquid-liquid systems?*

Do you think good mixing might make a big difference in the way a gas-liquid or liquid-liquid reaction behaves?

We can help you find out, for sure.

You probably want to know whether there's a simple way to discover the just-right balance of fluid flow and turbulence for greatest possible contacting efficiency. (There is.)

You're almost certainly interested in the relative efficiencies of small and large mixing impellers, under varying conditions of impeller speed and position. (We can pin them down for you, quickly.)

How to save research time

If your work involves gas-liquid contacting, you can save time by letting us figure out for you the most effective sparge ring diameter, and placement of holes, for a given horsepower level and gas flow combination.

On *any* fluid mixing operation, consider the time you'll save by making your pilot runs with calibrated mixing impellers that let you calculate power directly from simple speed measurements. (You can get these impellers from us; or have us do the calculating for you.)

And when you're ready to put the unit on stream, get the advantage of mixer selection from an almost unlimited range of power and speed combinations—with results accurately predicted and *unconditionally guaranteed.*

Doesn't this sound like the *practical* way to put fluid mixing to work for more profitable processing? Thousands of process engineers have found it so. For quick, competent help, phone your LIGHTNIN Mixer representative (listed in Chemical Engineering Catalog). Or write us direct.

Lightnin® Mixers

MIXCO fluid mixing specialists

HIGH-RATE GAS-LIQUID contacting operation is performed economically by twelve 200-HP turbine-type LIGHTNIN Mixers with multiple impellers.

FOR LATEST MIXING INFORMATION and full description of LIGHTNIN Mixers, send for these helpful bulletins:

- ☐ B-102 Top or bottom entering; turbine, paddle, and propeller types: 1 to 500 HP
- ☐ B-103 Top entering; propeller types: ¼ to 3 HP
- ☐ B-108 Portable: ⅛ to 3 HP
- ☐ B-104 Side entering: 1 to 25 HP
- ☐ B-112 Laboratory and small-batch production types
- ☐ B-109 Condensed catalog showing all types
- ☐ B-111 Quick-change rotary mechanical seals for pressure and vacuum mixing
- ☐ B-107 Data sheet for figuring mixer requirements

Check, clip, and mail with your name, title, company address to:

MIXING EQUIPMENT Co., Inc., 185-h Mt. Read Blvd., Rochester 11, N. Y.

In Canada: Greey Mixing Equipment, Ltd., Toronto 10, Ont.

Continuous mixer offered in small-sized model . . .

suitable for lab, pilot plant, small-scale production work

Smaller model of the Oakes continuous automatic mixer has been announced by the manufacturer. Used for mixing large variety of viscous materials, the new unit is suitable for laboratory, pilot plant, or small-scale production

Mixer is suitable for laboratory, pilot plant, and small-scale production work

work. Results are said to equal those obtained with larger models.

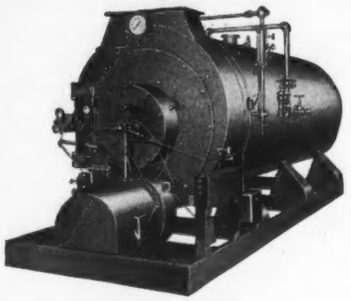
Mixer is also available on lease basis. Capacity ranges, horsepower requirements, and other equipment details may be modified to suit each application.

(Model 8M Oakes mixer is product of The E. T. Oakes Corporation, Dept. CP, Commack Road, Islip, Long Island, New York . . . or for more information reader may simply check 7075 on the convenient Reader Service slip opposite last page.)

For more information on product at left, specify 7076 . . . see information request blank opposite last page.

COUNT' EM!

CYCLOTHERM
CUTS STEAM PROCESSING COSTS 3 WAYS!



1. FUEL COSTS Cyclotherm Cyclonic Combustion means just what it says — controlled fuel and air, whirling at 200 mph, forming a cyclone in the furnace! This high velocity burning assures maximum efficiency in combustion and heat transfer, resulting in lower fuel consumption.

2. MANPOWER COSTS A fire without a fireman! Electronic controls operate the Cyclotherm safely and automatically. Smaller models cycle on and off as steam is required. On larger models, precision modulation coordinates the fuel-air ratio to the load demand, from 30% to 100% of rated capacity.

3. INSTALLATION AND MAINTENANCE COSTS Cyclotherm is factory assembled and factory pre-tested. All you do is make five simple connections. 50% maintenance savings are not uncommon. Return tubes cleaned in minutes with no removal or replacement of refractories. No standby unit needed.

And remember—one-third smaller than ordinary generators of similar capacity, a Cyclotherm fits almost anywhere. Many plants have installed two Cyclotherms for utmost flexibility and power. Burns gas or oil with quick changeover. 18 to 500 hp, 15 to 200 psi.

YEARS AHEAD IN STEAM GENERATION CYCLOTHERM
STEAM AND HOT WATER GENERATORS

Cyclotherm Division,
National-U. S. Radiator Corp.
2927 E. First St., Oswego, N. Y.

Please send me a free copy of your booklet giving full information on Cyclotherm Steam and Hot Water Generators.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

When inquiring check 7077 opposite last page

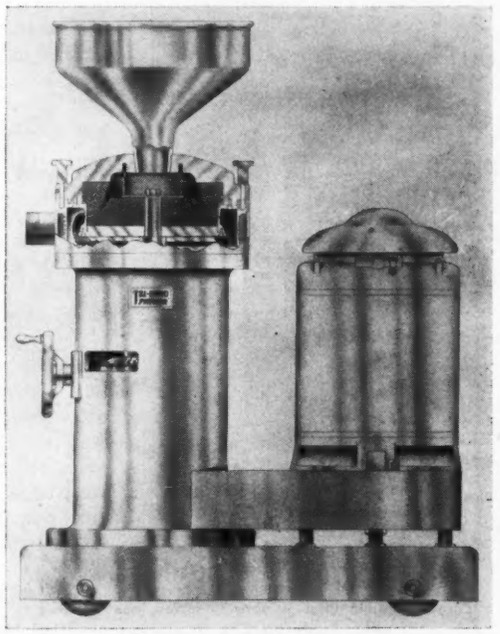
Up to 5000 gph handled by homogenizer

Heavy-duty unit has low maintenance, is designed for quick disassembly

Uses: Grinding, homogenizing, and dispersing pigments, slurries, and similar products.

Features: Designed for heavy-duty, long life, and low maintenance, machines are available with capacities ranging from 5 to 5000 gph. Mills can be quickly disassembled for easy cleaning.

Description: Machine is vertical-feed, capable of reducing particles to micron-sizes. Mill can be fed by gravity or pump. Water-jacketed head is



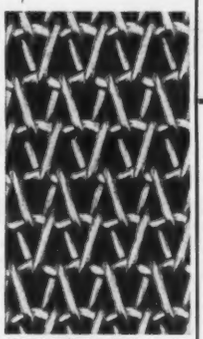
Cutaway shows rotor, stator, rotating screen-type trap on homogenizer

provided for cooling. Micrometer rotor adjustment is handwheel-operated—dial is graduated in thousandths.

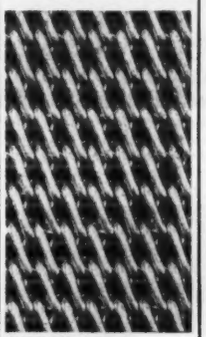
Rotor and stator can be furnished in stone or stainless steel. Stone construction uses abrasion-resistant steel wear rims to insure long life. Patented rotating screen-type trap at feed entrance prevents foreign objects from entering grinding chamber. Rotor speed is adjustable. Motors range from 1 to 100 hp.

(Pioneer homogenizer is product of Tri-Homo Corporation, Dept. CP, 100 Highland Avenue, Salem, Mass. . . . or for more information check 7078 on form opposite last page.)

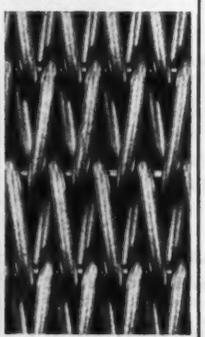
How to select WOVEN WIRE CONVEYOR BELTS for Continuous CHEMICAL PROCESSING



BALANCED—High tensile strength, low ultimate cost belting for operation up to 1300° F. Resists distortion. Designed for straight travel.



DUPLEX—Compact structure of great density provides high tensile strength. Close mesh provides smooth surface for carrying small-size particles, as well as sheet and slab materials that might be marked by more open weaves.



GRATEX—Close spirals retain the advantages of Balanced weave, while adding strength. For cold, medium and some high temperature applications.

As you know, woven wire conveyor belts are widely used for combining movement with processing and packaging of slab, sheet, pelletized and powdered materials. The advantages offered by open mesh construction for both wet and dry processing have resulted in steadily increasing demand for these belts in the chemical and plastic industries. Washing, forming, draining, heating, drying and bagging operations proceed uninterrupted, increasing production efficiency and product uniformity, decreasing waste.

However, there is no single type of belt construction suitable for all chemical and allied processing. Some must withstand constant operation at moderately high temperatures; some must provide a relatively smooth, non-marking surface for handling soft sheet or slab materials; some require open mesh for rapid drainage of process solutions or spillage from bagging machines; others need a close mesh to handle materials of small particle size. That's why Cambridge has nine basic weaves available in any metal or alloy. The three shown here are the most widely used in chemical and allied fields.

Two others, the CORDUROY and DOUBLE-BALANCED, are also employed where exceptionally smooth surface and close mesh are prime factors.

There are several factors that generally influence selection of weave, mesh size and metal or alloy from which the belt will be woven. Among them are: form and particle-size of materials to be handled; temperatures to which belt will be subjected; presence of wet or corrosive conditions. Even after these have been decided, overall belt construction must be designed to meet individual requirements—type of drive, selvage, support and special surface attachments must be selected.

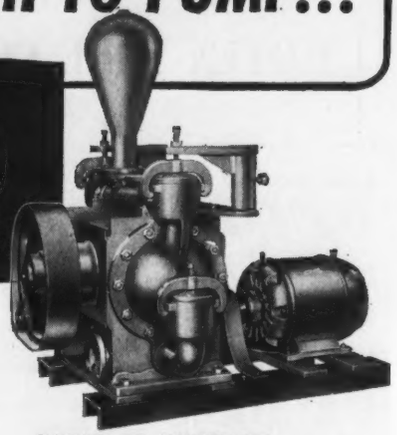
You can see, then, that designing for continuous chemical and plastic processing with woven wire conveyor belts is not a simple "nuts and bolts" job. Ramifications build up rapidly to demand the service of a specialist. That's why Cambridge maintains a staff of competent Field Engineers to help you select the Woven Wire Conveyor Belt to make your installation most efficient. You can rely on the experience of these engineers to specify just the right belt for you. In addition, they are thoroughly familiar with basic conveyor design. For the name of your nearest Cambridge Field Engineer, look under "Belting, Mechanical" in your classified telephone book. Or, write direct. Also ask for Special Report on a typical installation, "9 WAYS to Speed Production in RUBBER PROCESSING" and your copy of 130-page Reference Manual of specifications and design information.

THE CAMBRIDGE WIRE CLOTH COMPANY, DEPARTMENT F, CAMBRIDGE 8, MARYLAND.

When inquiring check 7079 opposite last page

IF IT'S TOUGH TO PUMP...

You need a **SHRIVER DIAPHRAGM PUMP**



for

- ✓ Corrosive
- ✓ Abrasive
- ✓ Viscous
- ✓ Thick • Heavy
- ✓ Delicate
- ✓ Hazardous Materials

POINTS TO REMEMBER

- No contact between fluid handled and mechanical parts of pump.
- No packings, hence no leakage.
- Easy to inspect and clean.
- Minimum maintenance cost.
- Parts contacting fluid made of any metal, rubber or synthetic resin lined.
- Ample pressure; wide capacity range.

Bulletin 137 tells why.

T. SHRIVER & COMPANY, Inc.

Filter Presses • Filter Media • Diaphragm Pumps

846 Hamilton St., Harrison, N. J.

Sales Representatives in Decatur, Ga.–Houston, Tex.–St. Louis, Mo. San Francisco–Montreal–Toronto

When inquiring check 7080 opposite last page

Binks spray nozzles
for washing, cooling, processing, humidifying, dehydrating, and hundreds of other applications.
You'll get the right nozzles quicker by calling Binks... manufacturers of one of the most complete selections ever produced.
There is a size and spray pattern for every purpose... with nozzles cast or machined from standard or special corrosion-resistant metals and materials.
MAIL COUPON NOW!
611
Binks
A COMPLETE LINE OF INDUSTRIAL SPRAY NOZZLES AND COOLING TOWERS
Binks spray nozzles
Binks Manufacturing Company
3120-32 Carroll Ave., Chicago 12, Ill.
O. K. Binks, send me your comprehensive Spray Nozzle Catalog without obligation.
NAME
COMPANY
ADDRESS
CITY ZONE STATE

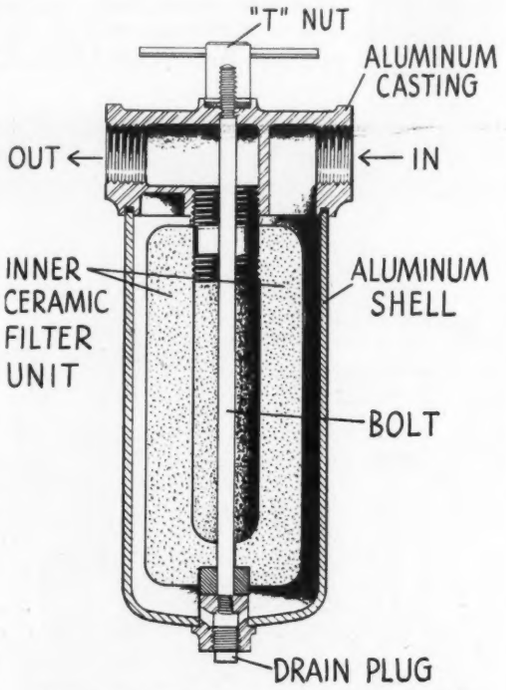
When inquiring check 7081 opposite last page

Porous ceramic filter resists most acids, has various uses . . .

unit easily cleaned by backwashing, made to fit into either ¾, 1, or 1¼" lines

Uses: Removing moisture, oil, sediment, or other suspended impurities from liquids or compressed gases.

Features: Filter is easily cleaned by backwashing, can be used over and over again. Porous ceramic is resistant to most acids, wide variety of chemicals.



Porous ceramic filter is easy to install, can be used either inside building or outdoors

Description: Filter consists of a porous ceramic filtering unit fastened inside an extruded aluminum shell, bolted to a cast aluminum top tapped for standard pipe threads. Aluminum parts are covered with corrosion-resistant plastic coating. Filter is easy to install, can be used in any convenient location — either inside building or outdoors.

Unit is available in three sizes — for use in either ¾, 1, or 1¼-inch pipe. Ceramic units come in fine, medium, or coarse pore types. Surface area varies from 84 to 106 sq in depending upon size of unit.

(Model C Flo-Clear filters are product of Filtros, Inc., Dept. CP, East Rochester, N.Y. Check 7082 opposite last page.)

PRODUCTION CONTROL BY *Electronic Longhand*

- PRODUCTION CONTROL
- ACCOUNTING
- SALES ORDERS
- QUALITY CONTROL
- TRANSPORTATION
- MAINTENANCE
- MATERIAL CONTROL
- CENTRAL FILES

Production Control works more efficiently when information is available quickly and accurately! TelAutograph's ELECTRONIC LONGHAND Telescriber System provides an INSTANT and Simultaneous means of written communication from Order Department to Stock Records – to Purchasing – to Production – to Shipping – to Billing. "Saying it in writing" leaves no room for misunderstanding or error. Buying, Inventory, Production Schedules and Shipping operations function more smoothly and efficiently. ELECTRONIC LONGHAND is effecting substantial savings for many of America's leading manufacturers where Production Control is a vital factor in building profits. Send coupon for full details, mailed to you.

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Please send brochure on use of TelAutograph in my business.
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Company
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County State
Type of Business
*Trademark Reg. U.S. Pat. Off.

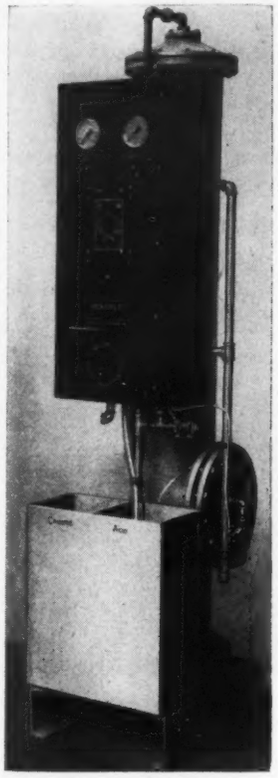
When inquiring check 7083 opposite last page

Purified water at 500-gph rate delivered by fully-automatic, compact demineralizer

Uses: Purifying relatively small quantities of water.

Features: Compact unit can deliver pure water at rates up to 500 gph. All operating functions, including regeneration, are automatic.

Description: Mono-column demineralizer operates on mixed-bed principle, producing effluent readings as high as 15 and 20 million ohms. Operating cost is only a few cents per 1000 gallons. Occupying 2 x 3′ of floor space, demineralizer is shipped as a completely packaged unit — ready for connection to water lines.



Compact demineralizer occupies 2x3′ of floor space

Column is plastic-lined. One regenerant tank only is supplied; this is for the caustic solution. Acid draw-up is directly from container. Process piping is 150-lb bronze pipe for all raw water lines, stainless steel or plastic for effluent lines. Regenerant piping is also corrosion resistant.

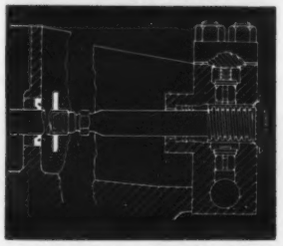
(Model MA-500 mono-column demineralizer is product of Penfield Manufacturing Company, Inc., Dept. CP, 19 High School Ave., Meriden, Conn. Check 7084 opp. last page.)

don't look now —

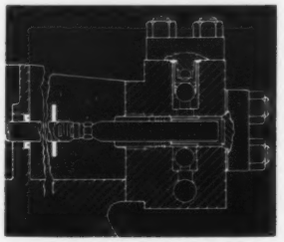
. . . but this magazine you are reading, CHEMICAL PROCESSING, comes to you without subscription price. Why?

Read what the Editors say on page 122.

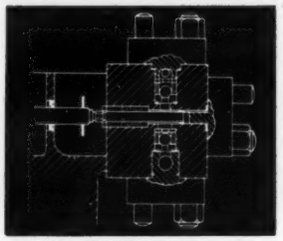
Name Your Triplex Pumping Problem **GAULIN** has a Maintenance-Saving Answer



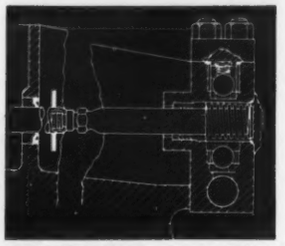
FOR FLUID, non abrasive products the Gaulin Spring-Loaded Poppet Valve provides low initial cost and low maintenance.



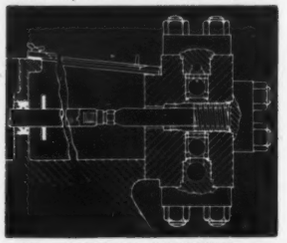
FOR SLIGHTLY ABRASIVE, viscous products, the Gaulin Ball Valve (adjusting screw packing, inserted seats) keeps maintenance costs down.



FOR VERY ABRASIVE products, the Gaulin Ball Valve (with adjusting screw packing, removable seats) provides the ultimate in low cost maintenance.



FOR VISCOUS, heavy-bodied products, the Gaulin Ball Valve (spring-loaded packing, inserted seats) provides excellent pumping efficiency and minimum maintenance.



FOR SLIGHTLY ABRASIVE, viscous products, where maintenance must be accomplished in minutes, the Gaulin Ball Valve with removable seats (spring-loaded packing) cuts maintenance time to the bone.

Name Your Capacity

There's a Gaulin to handle your capacity from 50 GPH to 5,000 GPH.

Name Your Pressure

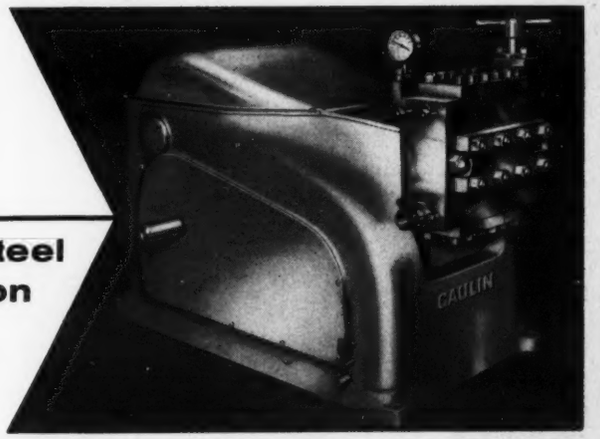
Gaulins are designed for 3 basic pressure ranges — up to 3,000, 5,000 and 8,000 psi.

Name Your Product

Only Gaulin designs a specific cylinder to handle every product efficiently, economically. Note some of our designs shown and described at the left.

Horizontal Design

Stainless Steel Construction



For Transfer, Metering, Spray Drying

A Gaulin Triplex Pump is a rugged, heavy-duty machine built to minimize operating, inspection, and maintenance costs. Compact. Simple. Dependable. Its horizontal design positively separates your product from the crankcase . . . and makes every part easy to get at.

Just lift two plates and a Gaulin drive and plunger assembly is convenient for inspection or repair.

A Gaulin Cylinder may be disassembled in a matter of minutes, cuts maintenance time to the bone!

Vibrationless. A Gaulin is practically free of vibration.

Corrosion-proof. All product contacting parts are stainless steel. Ceramic plungers or other materials are available for special applications.

Rugged Dependability. Thousands of installations with well-known companies prove a Gaulin provides unusually long service at minimum cost.

Write for new bulletin. Ask for No. P-55.

MG/105-1

Gaulin

Manton-Gaulin

Manufacturing Company Inc., 55 Garden St., Everett 49, Mass.

When inquiring check 7085 opposite last page

Now! The Right Glove For Your Job

Let PIONEER's "Hand Protection Clinic" Help!

Send (Attn: Hand Protection Clinic) a job description, including the answers to these questions, on your company stationery and we'll solve your glove problem for you. Assures you of maximum worker protection and comfort at the minimum cost.

1. Are gloves to protect the worker or the product?
2. How far up arm is protection required?
3. How much dexterity is required?
4. How much abrasion resistance is required?
5. What chemicals (i.e., solvents, etc.) are used?
6. Are extreme temperatures encountered?

Complete Glove Catalog available on request!

16 PIONEER all-neoprene Stanzoil glove styles withstand oils, greases, solvents, acids and caustics. Light, medium and heavy weights all with the safe non-slip grip.

PIONEER Stanzoil

the PIONEER Rubber Company

241 Tiffin Road, Willard, Ohio, U.S.A.

Pioneers in Industrial Hand Protection For Over 35 Years

When inquiring check 7086 opposite last page

Hydrogen sulfide — Toxicity: Extremely hazardous. Collapse, coma, and death from respiratory failure may come within a few seconds after one or two inspirations. Insidious poison as sense of smell may be fatigued and fail to give warning of high concentrations. Low concentrations produce irritation of conjunctiva and mucous membranes. Headache, dizziness, nausea and lassitude may appear after exposure.

—*From* "THE MERCK INDEX"

In a fully chemical process, Sherritt Gordon Mines, Ltd., refine nickel and cobalt from the ore . . . with large quantities of hydrogen sulfide to handle, this plant . . .

MONITORS THREE AREAS WITH ONE

. . . and can detect H_2S concentrations as low as 10 ppm

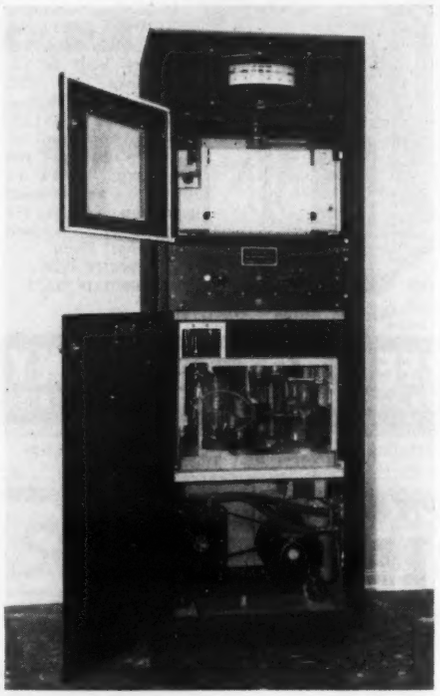
Problem: At Fort Saskatchewan in Canada, Sherritt Gordon Mines, Ltd., refines ore concentrates. Their self-designed $24-million plant, does not use conventional smelting. Instead, a completely chemical process leaches the ore with ammonia under pressure. Metals are extracted from the solution by chemical oxidation-reduction steps.

In the final step of the process, nickel drops out of solution as a powder. Remaining slurry contains traces of nickel and considerable quantities of cobalt salts. This slurry is treated with hydrogen sulfide to convert salts to insoluble sulfides. Considerable hydrogen sulfide is needed in the process and a special plant was built to produce it.

Since handling this gas in quantity is potentially hazardous, management at the refinery was concerned with setting up adequate personnel safeguards.

Electrolytic titration is carried on continuously in glass cell

Complete analyzer unit embodies recorder and operating controls



INSTRUMENT

Solution: Sherritt Gordon engineers installed a gas analyzer using electrolytic oxidation-reduction between gas sample and free bromine. This analyzer monitors atmosphere sample from three plant areas and gives warning when dangerous levels of hydrogen sulfide are reached.

Electrodes in the reation cell of the analyzer constantly monitor oxidation-reduction potential. End

(*Please turn to page* 136)

How to pump "handle with care" liquids and semisolids

New, air-operated *Ejectopump* works with a powerful yet gentle action—does not churn, whirl or chop the material being pumped. Whole grapes or even live goldfish can be pumped without damage. "Handle with care" liquids such as latex can be pumped without shear or turbulence. Inflammables can be pumped with safety since there are no electrical connections to cause sparks. Ideally suited for pumping highly abrasive and viscous liquids.

Ejectopump needs practically no maintenance. Has no rotating or reciprocating parts, no bearings, no packing, needs no lubrication.

Operation

Connect to any compressed air line 30 to 50 psi. Handles discharge heads up to 100 ft., with maximum suction 20 ft. Discharge rate may be precisely regulated. Pump is self-priming, may be installed above level of liquid pumped. Can be furnished in special alloys for pumping corrosives. Sizes: 1½", 2", 3", 4", 6".

WRITE TODAY for complete information and prices

FERRO CORPORATION
Supplies Division
4150 East 56th Street, Cleveland 5, Ohio

Ejectopump

COMPRESSED AIR OPERATED

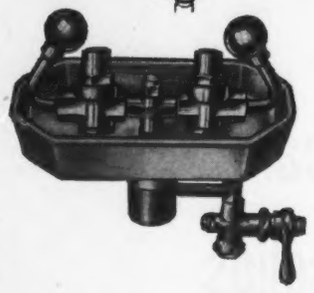
When inquiring check 7087 opposite last page

THERE'S DANGER IN "TIME"

HAWS EYE-WASH FOUNTAINS

Time elapsing between the accident and arrival of medical aid, is too often a cause of permanent eye injury. Bridge this time gap with a HAWS Emergency Eye-Wash Fountain. Installed at convenient locations, these HAWS safety devices are instantaneously ready when such accidents occur.

The HAWS Eye-Wash Fountain washes injurious chemicals out of the eyes with clean water at controlled pressure and volume. It is also available with Drench Shower Attachment... completing an emergency station for your employees' protection.



Designed and manufactured in cooperation with leading safety engineers

WRITE TODAY for brochure and full details

HAWS DRINKING FAUCET CO.

1439 FOURTH STREET (Since 1909) BERKELEY 10, CALIF.

When inquiring check 7088 opposite last page

DAVENPORT ROTARY STEAM TUBE DRYER

3'6" dia. x 30'0" long

DAVENPORT

PRESSING — DRYING and COOLING Equipment

Continuous DeWatering Presses

ROTARY DRYERS Steam Tube, Hot Air and Direct Fire

Atmospheric DRUM DRYERS

ROTARY COOLERS Water and Air

Drying Potassium and Sodium Perchlorate

To eliminate all possibility of explosion in drying such materials, "Davenport" Steam Tube Dryers are engineered with the utmost care.

Notice the sealed casing over the trunions which are purged with air to protect against sparking.

Let our engineers consult with you on your Pressing, Drying, and Cooling problems. Send for complete Catalog C, or for quick reference, consult your *Chemical Engineering Catalog*, 1954 or 1955.

davenport MACHINE and FOUNDRY COMPANY

DAVENPORT, IOWA U.S.A.

When inquiring check 7089 opposite last page

SAFETY

Sprays away static to stop sparks . . .

can also speed up operations where paper, plastic cling

Uses: Especially valuable as a spark retardant in hazardous operations, static spray can also be used where static causes paper or plastic web to cling together slowing up operations. It has also been used in the carpet industry to remove static from carpeting, on plastic auto seatcovers, and in laundries.

It can be used for floor impregnation where rolling trucks or castors generate static charges.

Aerosol can contains 12 ounces

It will stop effects of static charges on clothing or thread in textile work.

Features: Spray is packaged in handy twelve-ounce aerosol cans.

Description: Anti-static agent is available in aerosol or bulk form. Bulk product can be used for swabbing, wiping, spraying with hand pumps or hand power equipment. Material can also be fogged into materials by means of fully-automatic jet nozzles.

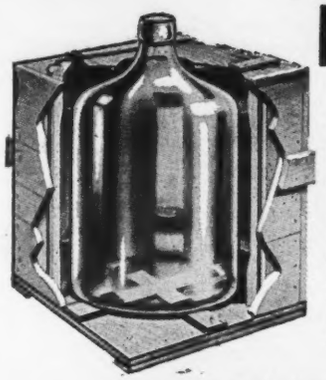
(Statikil is a product of Dept. P, Statikil Division, J. E. Doyle Company, Dept. CP, 1220 West 6th Street, Cleveland 13, Ohio. . . . or for more information reader may simply check 7090 on the convenient Reader Service slip which is located opposite last page.)

HERCULES CORK CUSHIONED 5-6½ and 13 gallon

aero RUBBER CUSHIONED 5-6½ and 13 gallon

ARMSTRONG CORK CUSHIONED 5-6½ and 13 gallon

CARBOY BOXES



Treen manufactured 5 — 6½ — and 13 gallon carboy boxes are quality built in accordance with ICC regulations, with features that give all-point protection; reducing hazards and breakage, ease in handling and compact loading. Available with either "A" Hood or Export Hood.

WRITE FOR COMPLETE DATA

"Aces in Cases" FOR OVER 50 YEARS

TREEN BOX COMPANY

TIOGA AND MEMPHIS STS., PHILADELPHIA 34

When inquiring check 7091 opposite last page

TROPICAL

COLD-PROCESS ROOFKOTER SAVES 50%

Use *unskilled labor*

Apply cold — *no fire hazard*

Extra years of life for leaky roofs!

From big automobile plants to small stores, Tropical Cold-Process Roofkoter is cutting roof reconditioning in HALF! Following our simple step-by-step method unskilled labor easily, quickly applies Roofkoter, to add extra years of weather-tight life to old roofs. Roofkoter stays "live", flexible; expands, contracts with temperature changes. Does not blister, crack or powder!

FREE! Send for free copy of "Saving Old Roofs"—save on repairs this year—write today!

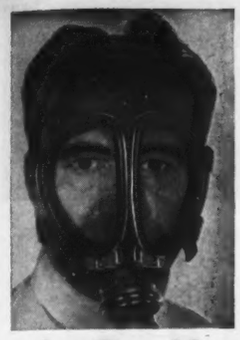
TROPICAL PAINT COMPANY

1128-1232 W. 70th, Cleveland 2, O.

HEAVY-DUTY MAINTENANCE PAINTS SINCE 1883

SUBSIDIARY OF PARKER RUST PROOF COMPANY

When inquiring check 7092 opposite last page



Specify

ACME

Full Vision®

...the Gas Mask that gives you MAXIMUM USABLE VISION

Vision-scope tests made with leading industrial gas masks prove that ACME Full-Vision gas masks lead the field in giving you clear, undistorted vision — up, down and to either side. Along with maximum usable vision, you get greater comfort, less fogging, minimum breathing resistance and acceptable conversation transmission — all, at down-to-earth prices.

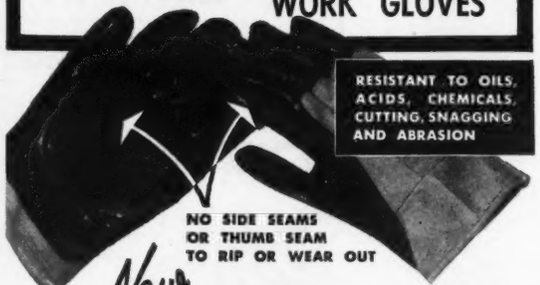
Write for Bulletin No. 562 on Vision-scope Tests and Bulletin No. 541 describing ACME gas masks.

ACME PROTECTION EQUIPMENT CO.
1219 Kalamazoo St., South Haven, Michigan

When inquiring check 7093 opposite last page

SURETY **GRIPTITE**

ROUGH FINISH COATED FABRIC WORK GLOVES



Now, **A POSITIVE GRIP IN OIL, GREASE, GASOLINE, ACIDS AND SOLVENTS**

Combining a vinyl base with a Sureseal rough finish, Surety Griptites achieve the qualities for long life and a claw-like grip. Here's comfort, service and safety that keep glove costs reasonable. Send for bulletin.

THE SURETY RUBBER COMPANY
Carrollton, Ohio
In Canada:
Safety Supply Co., Toronto

When inquiring check 7094 opposite last page

Standard and "engineered" safety equipment, clothes

Illustrated 12-page general catalog shows entire line of work clothing and protective aprons, sleeves, leggings, caps, headbands, and gloves. Made-to-order canvas and plastic bags, machinery and business machine covers, drop cloths, and other safety accessories are included.

"Protective, Maintenance, & Service Items" is issued by Associated Bag & Apron Co., Dept. CP, 2650 Belden Ave., Chicago 47, Ill. Specify 7095, opp. l. pg.

Describes 'Isles of Quiet'

Printed in two colors, four-page bulletin describes various sound control devices for office or plant communications. Giving complete specifications and prices, booklet lists and pictures phone booths for use in noisy locations.

Bul A-140 is issued by Burgess-Manning Co., Architectural Products Div., Dept. CP, 5970 Northwest Highway, Chicago 31, Illinoi. Specify 7096, opposite last page.

Cartoon above is reproduction of National Safety Council poster 0493-A. For more information write National Safety Council, Dept CP, 425 N. Michigan Ave., Chicago 11, Ill.

CESCO RIGHT...before your Eyes!

Snap-fast Face Shield with deflector crown

Open top Snap-fast Face Shield

Helmet-type Face Shield

Full-visibility Helmet-type Face Shield

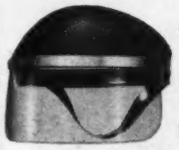
Spark Shield

NEW! CESCO All-Purpose Face Shield

for general shop work

The CESCO **770 Face Shield** comes in three window lengths of 4", 6" and 8" (top to bottom). The windows mount inside an aluminum channel in a tight assembly impervious to the entrance of dirt or liquid.

The head band of vinyl plastic is adjusted by a sliding strap. There is no metal or mechanical adjustment to snag the hair. The shield conforms easily to the head at all points. Windows are of cellulose-acetate and may be in either green or clear.



Contact your nearest CESCO distributor today or write for complete information and prices.

Write for complete Catalog

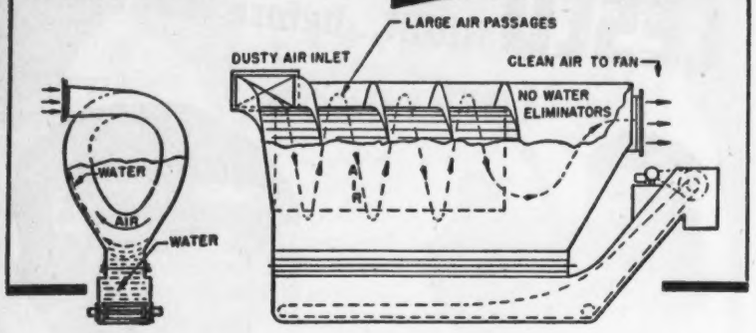
CHICAGO EYE SHIELD COMPANY
2316 Warren Boulevard, Chicago 12, Illinois

OFFICES IN: Atlanta, Baton Rouge, Birmingham, Boston, Buffalo, Cincinnati, Cleveland, Columbus, Dallas, Denver, Detroit, Houston, Kansas City, Knoxville, Little Rock, Los Angeles, Louisville, Mexico City, D.F., Milwaukee, Montreal, Orange, Peoria, Philadelphia, Pittsburgh, Salt Lake City, San Mateo, Spokane, St. Louis, St. Paul, Toledo, Tulsa

CESCO FOR SAFETY

When inquiring check 7097 opposite last page

THIS IS THE .... Air Tumbler



the master of **DUST** *in industry* ★ ★ ★

SIMPLE—DEPENDABLE
NO FIRE HAZARD
HIGH EFFICIENCY
CONSTANT CAPACITY
LOW OPERATING COST

Write for Bulletin No. 551. Address:

DUST SUPPRESSION & ENGINEERING COMPANY

P. O. BOX 67, LAKE ORION, MICHIGAN

Agents in all principal U. S. cities

When inquiring check 7098 opposite last page

FULL CONE—HOLLOW CONE—FLAT SPRAY

Spraco has the most complete line of nozzles available anywhere — **IN STOCK.** Capacities range from ⅛ pint/min. to 4000 gal./min. Bronze, cast iron, and stainless steel. Write for our nozzle catalog.

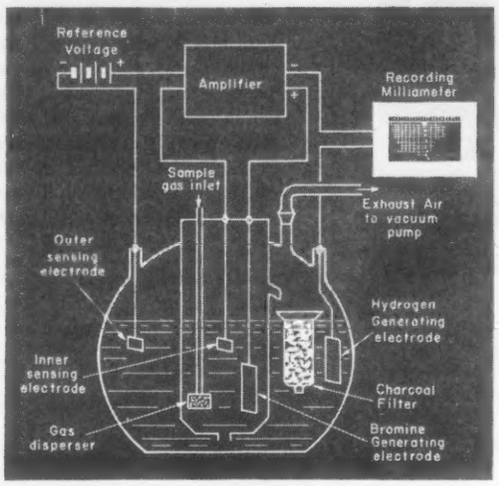
SPRAY ENGINEERING COMPANY

125 Central St., Somerville, Mass.

When inquiring check 7099 opposite last page

Gas Analyzer

(*Continued from page* 133)



Schematic shows placement of electrodes and components within cell

point conditions are maintained continually by generating enough bromine to oxidize sulfides introduced with the sample. This bromine is generated electrolytically.

Bromine-generating current is recorded since it varies directly with the amount of sulfur compounds in the sample stream.

Reaction cell is made part of a feedback loop in an inverse feedback electronic amplifier. Signal input to the amplifier is applied by sensing electrodes. Amplifier output current generates bromine. By this means, both electronic speed of response and sensitivity of potentiometric end point determinations are applied to a continuous chemical reaction.

This analyzer will record quantitative hydrogen sulfide, sulfur dioxide, mercaptans, thiophene, and organic sulfides and disulfides in concentrations as low as 0.1 ppm.

At Sherritt Gordon, analyzer has been used to monitor three sections of the sulfide precipitation building. Analyzer is fed a sample stream of gas from each section in turn. An automatic timer opens one of three valves for a pre-set, adjustable interval. As any valve opens, it activates a light on a control panel, showing operator which section is being tested. High-concentration contact actuates alarm.

Results: Analyzer has provided a practical means of protecting personnel in the building against dangerous concentration of hydrogen sulfide. This device is also being used in several chemical plants in the US for health protection.

(Titrilog is a product of Consolidated Electrodynamics Corp., Dept. CP, 300 N. Sierra Madre Villa, Pasadena, Calif. Check 7100 opp. last page.)

Special Sale SPARE HUMAN HEADS

Don't lose your head, Use your head!

We think it is smarter to play safe. Wear safety helmets and use Swagelok® FITTINGS

GET ALL THE FACTS: Write for the Swagelok catalog. Address Dept. C8

CRAWFORD FITTING CO.
884 EAST 140th STREET
CLEVELAND 10 OHIO

When inquiring check 7101 opposite last page

We challenge you

to find better

PROTECTIVE CLOTHING!

Toughest by Test FROG BRAND®

illustrated above: ¾ length coat

Sawyer

For every industry where personnel protection and safety are vital, only Sawyer Neoprene Latex Clothing offers all these advantages:

- 100% protection against oils, chemicals, alkalies, abrasion — and other hazards!
- "Exclusive Coating Process" . . . (for years and years of extra wear and durability) — *original* with Sawyer!
- guaranteed not to peel, blister or crack in ordinary usage!
- double interlocked sewn seams that can't come apart!
- solid brass or non-conductive fastenings that can't rip off or corrode!
- designed for roomy, action-free comfort!

Sawyer clothing also Rubberized or Oiled. Full range of jackets, pants, coats, hats, aprons for more efficiency, more economy, more protection on every job!

Make us prove it!

Send for complete details and price list.

The H. M. Sawyer & Son Company

A Division of Sawyer-Tower, Inc.

Specialists in Protective Clothing for more than a century

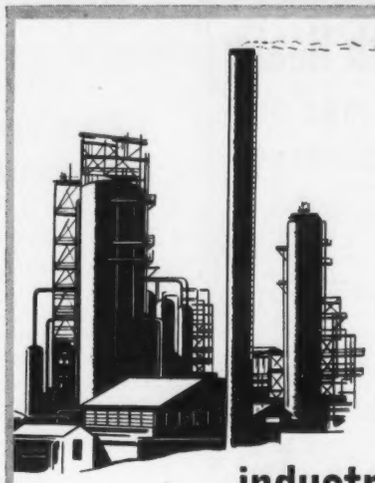
5 Thorndike St., Cambridge 41, Mass.

When inquiring check 7102 opposite last page

CHEMICAL PROCESSING wins Safety Award for second consecutive year

For the second consecutive year CHEMICAL PROCESSING has been presented with the National Safety Council's Public Service Award for "Exceptional Service to Safety." The award was presented in recognition of the articles and stories CHEMICAL PROCESSING published in 1955 concerning safety methods and practices in the chemical processing industries.

Shown accepting the award from K. A. Kelsen, Staff Representative of the Chemical Section of the National Safety Council, is CP Assistant Editor, Bill Schremp. Russell L. Putman, (left) CHEMICAL PROCESSING publisher, and John C. Vaaler, CP Editor, look on.



A practical, realistic answer to the problem of industrial air pollution

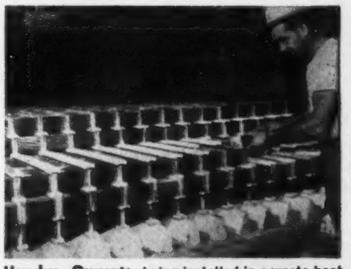
Catalytic oxidation can now eliminate objectionable fumes and odors from your stack exhausts effectively, efficiently — and often at an actual saving — with the use of Houdry Oxycats®

Properly engineered to your individual requirements, Houdry catalytic installations can eliminate, or reduce below objectionable levels, harmful and irritating fumes and odors in an exhaust stream.

These Oxycat installations are working effectively for a wide range of industries where combustible and organic pollutants are present, including solvents, phenols, formaldehyde, phthalic anhydride, polyethylene and carbon monoxide. Oxycats can also be used to oxidize H_2S and organic sulfides and to reduce oxides of nitrogen. And in many cases the heat released by the oxidation process will result in important fuel savings.

The key to any successful catalytic installation, of course, is the catalyst itself. Oxycats have an outstanding advantage in their exceptionally long life at high efficiency. There's no problem of frequent cleaning or reprocessing because of the Oxycat's remarkable ability to withstand contaminating agents and clogging.

It's best to design Houdry Oxidation Catalyst installations into your plant when it is in the blueprint stage. But your engineers, working with ours, can effectively install Oxycats in any existing plant. If air pollution is a problem in your operation—if foul-smelling, irritating fumes and odors are costing you neighborhood good will—Houdry Oxidation Catalysts present a solution you cannot afford to overlook. Write on your business letterhead for complete information now.



Houdry Oxycats being installed in a waste heat boiler at a Sun Oil Co. catalytic cracking unit at Marcus Hook, Pa. This Oxycat installation and a similar one at Toledo save Sun Oil $400,000 a year by oxidizing waste gases to generate 100,000 lb. of process steam an hour.

OXYCAT

A Houdry Catalyst

OXY-CATALYST, INC.

INDUSTRIAL DIVISION

Wayne 7, Pa., U.S.A.

Fume Elimination Processes and Equipment

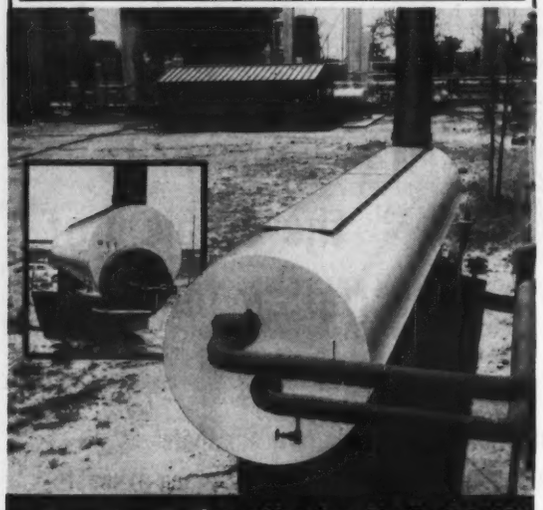
Industrial • Automotive • Consumer Products

Representatives in major industrial areas

When inquiring check 7103 opposite last page

New BS&B Salt Bath Heater

Provides Safest Method Of High Temperature Heating!



...Provides Uniform Heating Up To 800°F!

SAFETY AND ECONOMY FEATURES:

- ✓ Uniform heating eliminates hot spots and reduces possibility of firebox burn-out and coking or fouling of coils.
- ✓ Flexible bellows assembly combined with a "floating" stack eliminates firebox and head failure due to intermittent firings.
- ✓ Heat transfer salt bath operates at atmospheric pressure, and therefore cannot cause vessel rupture.
- ✓ Molten salt is non-corrosive to carbon steel, non-volatile, thermally stable and non-toxic.
- ✓ Ample space for the salt has been provided to prevent "boiling over." Salt requirements have been minimized for greater economy.
- ✓ Reliable BS&B heater controls with dual temperature controls are standard equipment. BS&B pilot light permits either snap-acting or throttling burner controls with minimum possibility of pilot failure.

For complete details on the new BS&B Salt Bath Heater, contact your nearest BS&B Representative, or write to . . .

BLACK, SIVALLS & BRYSON, INC.

Oil & Gas Equipment Div., Dept. I-M8
1708 West Main Street
Oklahoma City, Oklahoma

EFFICIENCY BS&B RELIABILITY — ANOTHER EXAMPLE OF PRODUCT LEADERSHIP

When inquiring check 7104 opposite last page

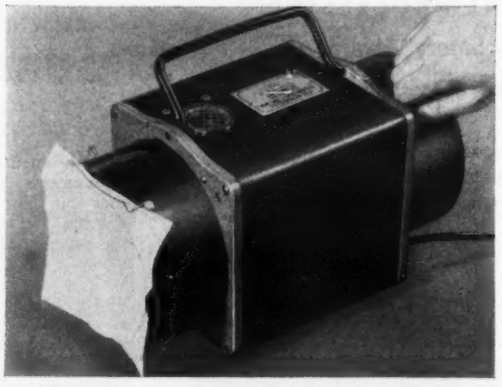
Air sampler maintains constant flow rate

Compensating damper controls movement of air

Uses: Instrument is designed to collect samples of air contaminants to be weighed and analyzed in connection with industrial hygiene or air pollution problems.

Features: Sampler has automatic flow control which compensates for changes of filter resistance caused by collected material.

Description: Automatic control of air flow rate is provided by compensating damper in a by-pass duct for unfiltered air. Filtered air enters a plenum chamber and passes through a fixed orifice in a



Air sampler has automatic flow control which compensates for changes of filter resistance caused by collected material

spring-loaded diaphragm plate. As filter resistance increases, pressure in plenum chamber decreases, thus releasing diaphragm plate to close a switch that starts the by-pass damper motor. Damper reduces by-passed air flow, thereby increasing suction through the filter. Changes in supply voltage also cause damper operation to increase or decrease by-passed air flow and thus maintain constant volume through filter.

Unit has no gages to watch and no adjustments. Wide variety of filter media can be used without knowledge of their specific resistances. Any of three flow rates may be selected by user: 15, 30, and 50 cu ft per minute. Unit is 7¼ x 7¼ x 15 inches and weighs 13½ pounds.

(Air Sampler is manufactured by Mine Safety Appliance Co., Dept. CP, Pittsburgh, Pa. . . . or for more information reader may simply check 7105 on the convenient Reader Service slip which is located opposite last page.)

New Truck-loading . . . Batch Type

Despatch CHEMICAL DRYING OVEN

- Models available in 3 temperature ranges
- Controlled exhaust of saturated air
- Complete removal of explosive volatile
- Available for gas, electric or steam
- Optional equipment includes loading truck, extra shelves, timed exhaust, special controls and larger capacities

Write for Bulletin 100

For convenience of handling large batches of chemicals, the Despatch No. V-39 is the answer—ideal, too, for finish baking, curing, aging, dehydrating or preheating any heat reactive product. The V-39 easily handles big fully loaded floor trucks that can be rolled right into the oven. Specially arranged horizontal ducts provide a uniform, high volume blast of air over and under each shelf to assure thorough drying. Available in 3 temperature ranges: Standard 100°-500° F.; Heavy Duty 250°-650° F.; Super Duty 450°-850° F.

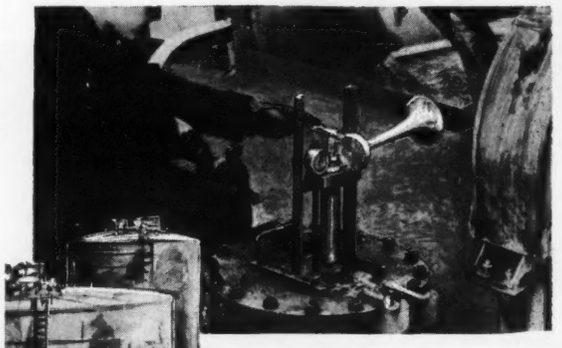
DESPATCH OVEN CO. Established 1902

343 Despatch Building
Minneapolis 14, Minnesota

When inquiring check 7106 opposite last page

AUDIO AID AVOIDS TANK OVERFLOW

Automatic signal device for liquid-handling operations



Falcon's Tank Overflow unit automatically signals operator when liquid approaches capacity level. Loud blast gives ample warning.

SEND for details to:

FALCON ALARM Co., Inc.
243 Broad Street, Summit, New Jersey

When inquiring check 7107 opposite last page

Attached to hard hat, goggles swivel down, up as needed

Uses: Combination hard hat and safety goggles are designed for chipping, welding, or other tasks needing combined head and eye protection.

Features: Permanently attached to hat, goggles swivel up or down as needed.

Description: Cover-glass-style goggles are designed to be comfortable even when worn over personal glasses. They are adjustable for pupilary distance. They have individual cup action for comfortable fit. Mounting bracket permits goggle to be worn slightly off the face — this aids in comfort when gas welding, cutting, or spotting.

Goggles are designed to be comfortable even when worn over personal glasses

Hard hat has floating plastic construction — head size is adjustable from 6½ to 8. Replaceable sweat band can be changed if hat is to be reissued.

("Supergard" Cap is a development of Boyer-Campbell Co., Dept. CP, 6450 St. Antoine St., Detroit 2, Mich. Check 7108 opposite last page.)

Have you wondered why you receive this magazine, CHEMICAL PROCESSING, without subscription charge? See page 122.

WAGNER ELECTRIC MOTORS...THE CHOICE OF LEADERS IN INDUSTRY

Designed for use in chemical plants

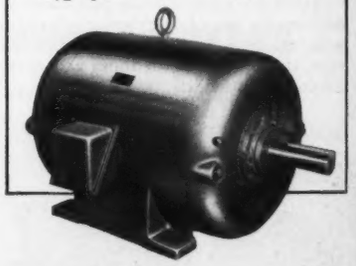
WAGNER EP MOTORS

Here are stock motors specifically designed for the chemical industry —they're fully protected against corrosive fumes and liquids, dust, dirt or moisture.

Such protection is assured by totally-enclosed fan-cooled construction in corrosion-resistant cast iron frames. Extra protection is given the laminations by a wall of cast iron that completely surrounds the stator. Even though the windings are completely enclosed, they are treated with a special coat of varnish that resists acids and alkalies. A running shaft seal, sealed leads and a gasketed conduit box give still further protection to these motors.

A skilled Wagner engineer, expert in motor applications, can help you select the Wagner Motor that meets your most exacting specifications. Call the nearest of our 32 branch offices, or write us.

Wagner Chemical Plant Motors are available in ratings from 1 to 250 hp in standard (Type EP) and explosion-proof (Type JP) designs, and in Non-ventilated corrosion-resistant standard and explosion-proof types in ratings from ½ through 1½ hp.

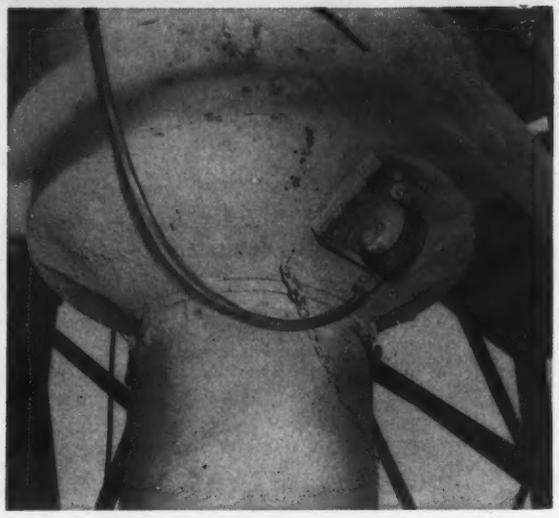


Wagner Electric Corporation
6359 Plymouth Ave., St. Louis 14, Mo., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS–AIR AND HYDRAULIC

When inquiring check 7109 opposite last page



Typical AiroViber vibrator installation to keep bulk materials moving.

Low cost AiroViber speeds movement of bulk materials by trouble-free vibration

Operates quietly, effectively in wide range of temperatures; requires no maintenance

Trouble-free—External vibration for effective movement of bulk materials in loading, unloading, moving, packaging, processing, grading or separating is now available to you in the low cost AiroViber vibrator. Simple design of AiroViber involves only one moving part and ends necessity of down time for periodic maintenance or lubrication. It also includes a noise reducing design that eliminates annoyance of sounds often experienced in ordinary types of vibrators.

AiroViber's one-moving-part construction assures you of continual operation in wide range of temperatures. It will also start and operate at all times and is not affected by humidity.

AiroViber's simple design assures trouble-free vibration.

How It Operates

Vibration necessary to keep materials from jamming, arching or hanging up in bins, hoppers, chutes, feeders . . . is created by the AiroViber vibrator through action of a single heavy steel ball blown by compressed air around a hardened and ground steel track in the housing. A strong centrifugal force developed by the weight of the ball is then transmitted by the vibrator through its mounting into the object being vibrated.

Installation Is Easy

Because of its simplified design, AiroViber may be installed quickly and easily. And, since no upkeep is required, you can install this vibrator in hard-to-get-at locations . . . fully confident that it will operate for a long time without lubrication or maintenance. Special line oilers or air filters are not needed . . . merely hook up an air hose large enough to deliver air specified for the unit you select.

Find out how AiroViber vibrators can save you money and time in moving bulk materials. For illustrated literature and address of nearest distributor, write Viber Company, 726 South Flower St., Burbank, Calif., Dept. 10C8.

VIBER

VIBRATORS SINCE 1931

When inquiring check 7110 opposite last page

Purity of liquid latex and other products guarded by lightweight fibre drums used with polyethylene liners, which —

SAVE $800 PER M IN FREIGHT C

Polyethylene liners being inserted in fibre drums at UBS Chemical Corporation preparatory to packing. Note filled drums in foreground

GORDON WEYERMULLER, Associate Editor
With **LINCOLN L. REDSHAW,** V. P., Mfg.
UBS Chemical Corporation
Cambridge, Massachusetts

Problem: Four years ago during the steel shortage, UBS Chemical Corporation had to use some second-hand steel drums, along with new drums, for packaging their liquid chemical products. Used drums, which were of odd shapes and sizes, developed leaks in some cases. Plant had a problem in cleaning the drums satisfactorily before packaging. In addition, weight of the drums during handling and shipping was a disadvantage. Products packaged included liquid latex, adhesives, coatings, and polymer emulsions.

Solution: In 1952 plant started using fibre drums together with polyethylene liners. Company signature is silkscreened on each drum. Container has a filled net weight of 400 lb.

Results: Freight saving of 25 lb is obtained on each fibre drum shipped. On a truckload of 64 drums, 1600 lb is saved. This saves $25 in freight on a typical trip, such as one from Cambridge, Mass., to Greenville, S. C. This amounts to about $800 per month saved in freight on the 2500 containers shipped each month.

The new, single-trip container, with the polyethylene liner, emphasizes purity of

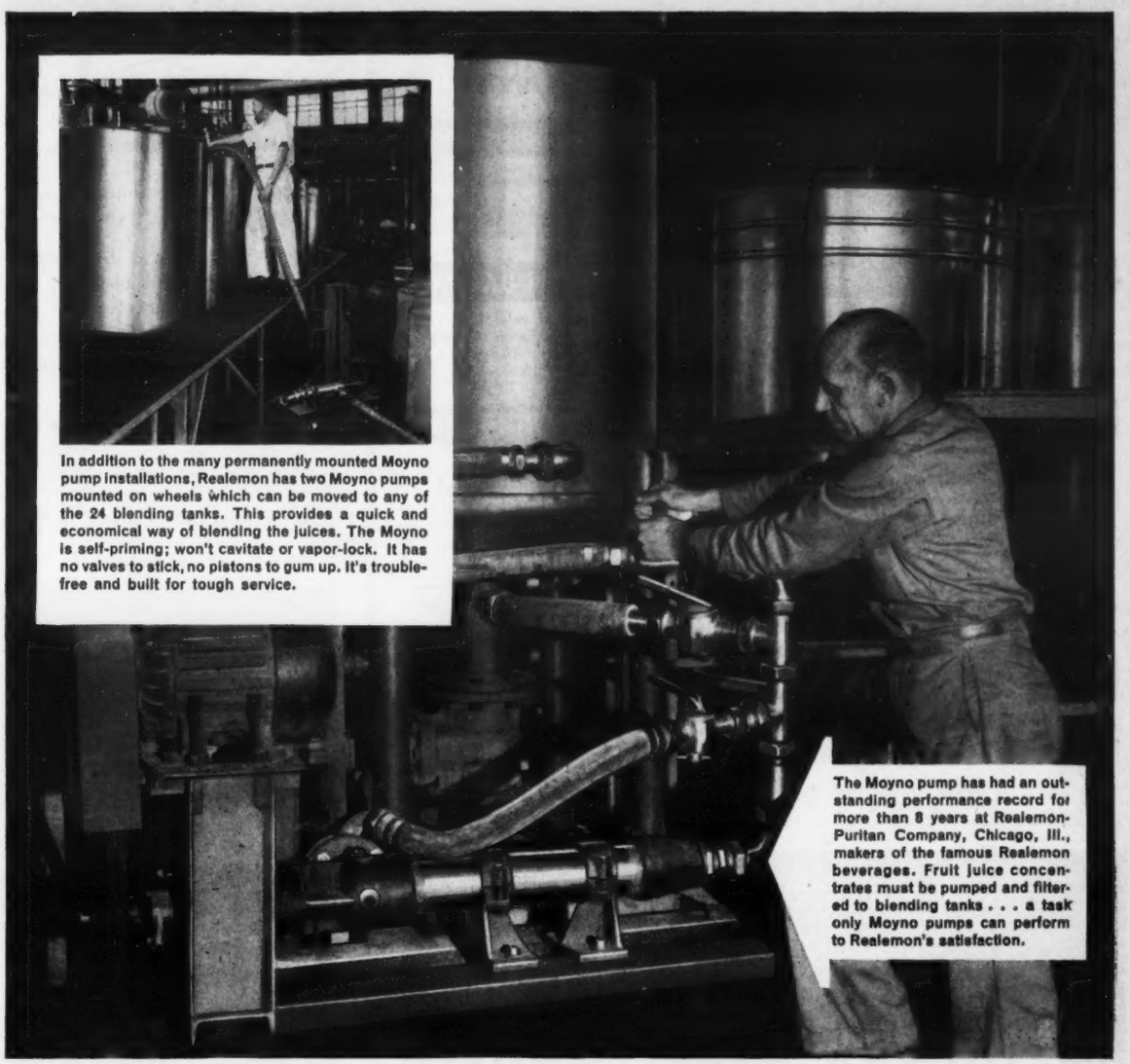
PER MONTH
GHT COSTS

the product and keeps it from being contaminated. Fibre drums have an intangible value in the uniform package and favorable appearance achieved. Leaks have been eliminated.

Fibre drums average out about the same price as the steel drums, considering fluctuation in the price of steel drums and the fact that reconditioning has been eliminated. Steel drums are still used for export shipments.

(Fibre drums are product of Continental Can Co., Inc., Dept. CP, 100 E. 42nd St., New York 17, N. Y. . . . or for more information check 7111 on form opposite last page.)

(Polyethylene liners are product of Hedwin Corp., Dept. CP, 1600 Roland Heights Ave., Baltimore 11, Md. . . . or for more information check 7112 on form opposite last page.)



In addition to the many permanently mounted Moyno pump installations, Realemon has two Moyno pumps mounted on wheels which can be moved to any of the 24 blending tanks. This provides a quick and economical way of blending the juices. The Moyno is self-priming; won't cavitate or vapor-lock. It has no valves to stick, no pistons to gum up. It's trouble-free and built for tough service.

The Moyno pump has had an outstanding performance record for more than 8 years at Realemon-Puritan Company, Chicago, Ill., makers of the famous Realemon beverages. Fruit juice concentrates must be pumped and filtered to blending tanks . . . a task only Moyno pumps can perform to Realemon's satisfaction.

Moyno® Pump exclusive choice of Realemon engineers for pumping juice concentrates

In the preparation of many of the famous Realemon products, concentrated fruit juices often must be pumped and filtered to blending tanks.

Pumps formerly used to handle this exacting process wore out completely in a few months because of their inability to stand up under the high acids in citrus juice concentrates.

Realemon then changed to the Moyno pump. Its unique rotor and stator arrangement forms sealed progressing cavities that move the material and provide positive displacement. For this Realemon application, Moynos with chrome-plated rotors and synthetic rubber stators were selected, to assure trouble-free service and long pump life.

Moyno pumps have now been in operation at Realemon for more than eight years, with an outstanding performance record. The only maintenance required is simply to replace the rotor and stator about once a year.

Moynos regularly handle a wide variety of products that other types of pumps can't handle—products such as potato salad, chow mein, fruit, alkalis, pastes, paints, tar —even cement and plaster.

Perhaps the Moyno will solve your pumping problems, too. Write us today for complete information. Ask for a free copy of Bulletin 30-CP.

ROBBINS & MYERS, INC.
MOYNO PUMP DIVISION

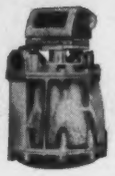
Springfield, Ohio
Brantford, Ontario

When inquiring check 7113 opposite last page

BOWSER
ESTABLISHED 1885

METERING 1

Bowser meters with ticket printers provide accounting records of liquid receipts, transfers and deliveries.



CUTS COSTS 3 WAYS

CONTROLS INVENTORY

Perpetual inventory and accurate control of process liquids in plant pinpoints profitable operation.

FILTERING 2

Bowser filters of all types are available for filtration of nearly every process or industrial liquid.

IMPROVES QUALITY

Uniformity of color and clarity with better quality control assures efficient processing of finer end-products.

BLENDING 3

Bowser blenders proportion and combine any number of liquid components in a continuous, closed system with highest accuracy at pumping flow rates.

SAVES MAN-HOURS

Hand "batching" is eliminated. Push-button control automates production to cut costs, improve profits.

Write for "DiGEST"

Bowser "liquid automation" equipment is available on lease or progressive payments to conserve working capital.

BOWSER PROGRESSIVE PROCUREMENT PLAN

REGIONAL OFFICES: ATLANTA · BOSTON · CHICAGO · CLEVELAND · DALLAS · KANSAS CITY · LOS ANGELES · NEW YORK

BOWSER, INC., 1315 E. Creighton, Fort Wayne, Ind.

When inquiring check 7114 opposite last page

provide complete protection during shipment with INLAND

STAINLESS STEEL DRUMS

If purity is essential in the shipment of your product, it will pay you to investigate Inland Stainless Steel Drums. Made from types 304, 316 or 347 stainless steel in either open or closed head style, and I-bar or swedged rolling hoops.

Available with double-seamed construction and reinforced chimes to comply with I.C.C. 5. Sizes: 15, 30 and 55 gallon.

Also available in all-welded construction with cadmium coated I-bar rolling hoops and chime reinforcements to conform to I. C. C. 5 C. Sizes: 30 and 55 gallon.

Full line of steel and stainless steel shipping containers, including galvanized and heavy duty ICC drums. Write for information.

INLAND STEEL CONTAINER COMPANY

Division of Inland Steel Company • 6532 South Menard Avenue • Chicago 38, Illinois • Plants: Chicago, Jersey City, New Orleans, Cleveland and Greenville, Ohio

When inquiring check 7115 opposite last page

Accurately weighs, dispenses small quantities of powder, granulated products . . .

models for fractions of ounces to 175 ounces have accuracy of better than one percent

Uses: Weighs and dispenses variety of granulated and powdered materials. Material is delivered by chute to container.

Features: Ten models have composite weighing capacity of 0.035 to 175 ounces. Accuracy is one percent or better.

Description: Dispensing balance combines symmetrical beam balance with container-feeding arrangement. This device can be operated by completely unskilled labor. Rapid discharge mechanism permits 600 to 2000 weighings to be made in an hour.

Discharge after weighing is accomplished by vibratory feeder

In operation, feeding mechanism stops automatically when desired weight is on pan. A signal light indicates completion of weighing. Operator then presses release lever (or foot pedal). Material is discharged through chute to container.

Modified version is designed for sterile operation. All metal parts in contact with products are stainless. Operator's hands never touch material being processed.

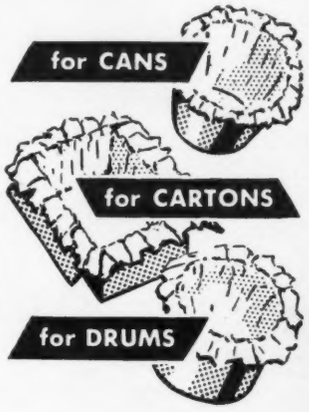
Since feeding mechanism uses vibration, no motors, mixing devices, or rotating parts are employed. This

C line

POLYLINERS

Put the finger on WASTE & SPOILAGE

Poly Liners make good things much better. Experience proves that C-Line Polyethylene Liners provide extra protection that stops waste and spoilage.



C-Line Poly Liners are odorless, tasteless, non-contaminating . . . water-proof, non-absorbent and resist most acids and alkalies . . . strong and tear resistant.

C-LINE POLY LINERS ARE ECONOMICAL—THEY CAN BE RE-USED—YOUR ADDITIONAL PROFITS COME FROM SAVINGS IN PACKING, CAPACITY AND PRODUCT PROTECTION.

For complete information . . . contact the C-Line Personal Service Department.

PLASTICS DIVISION
CANTON CONTAINERS, INC.
Canton 7, Ohio . . . Phone GL 5-5346

When inquiring check 7116 opposite last page

simplifies maintenance and cleaning.

("Auto-Weigh" Dispensing Balance is manufactured in Germany and distributed in this country by C. A. Brinkmann & Co., Dept. CP, 378-380 Great Neck Rd., Great Neck, L. I., New York . . . or for more information check 7117 on form opposite last page.)

Operator only inserts parts, machine pulls vacuum, heat seals . . .

designed for experimental use, vacuum packer can also be used on short production runs

Uses: Machine is manufactured for experimental use or short production runs on vacuum-formed packages.

Features: Operator loads parts to be packaged and moves oven into place. Machine holds packaging materials over parts for a pre-determined

Pulls vacuum and heat-seals drape-formed packages

period of time. Operator need only insert parts to be packaged — machine automatically repeats procedure without requiring additional settings by operator.

Description: Unit is semi-automatic machine, completely self-contained and using 230v, 60-cycle power. Using 3000-watt heaters, unit weighs approximately 375 lb and has a vacuum pump of 4.5-cfm capacity.

(PAK-O-VAC is manufactured by Product Packaging Engineering, Dept. CP, 5747 Marilyn Ave., Culver City, Calif. Check 7118, opposite last page.)

Continental's
FIBRE DRUMS

RIGIDLY INSPECTED FROM TIMBERLAND TO FINISHED DRUM

At Continental we have complete control over every step in the process of making fibre drums. We have our own timberlands, paper mills, and fibre drum plants and follow rigid inspection procedures. That's why Continental fibre drums are unsurpassed for rugged durability and give extra protection to your product in shipping and storage.

Neat, trim Continental fibre drums are tailored to fit your product and expertly printed or spray painted. Their light tare weight will save you money on shipping expenses, too.

Check the advantages of Continental's fibre containers—Leverpak, Stapak, or Fiberpak—and discover how they can help increase your profits. Call us today.

CONTINENTAL CAN COMPANY

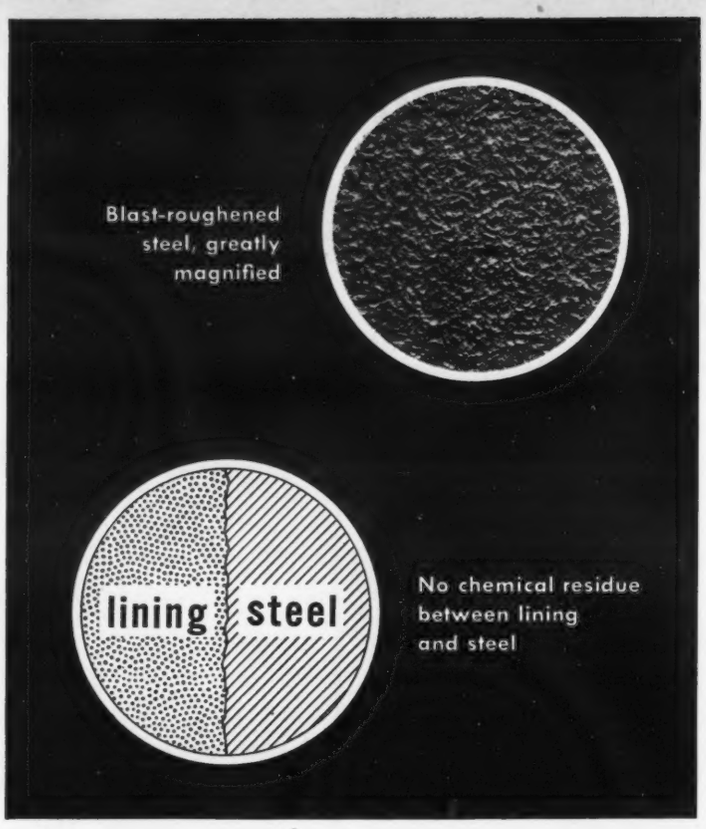
TAILOR-MADE PACKAGE SERVICE

FIBRE DRUM DIVISION • VAN WERT, OHIO

New York • Philadelphia • Pittsburgh • Tonawanda • Cleveland • Chicago • Atlanta • St. Louis • San Francisco • Los Angeles • Eau Claire • Boston

When inquiring check 7119 opposite last page

Rough treatment proves



Rheem Shot-Blasted drums can take it

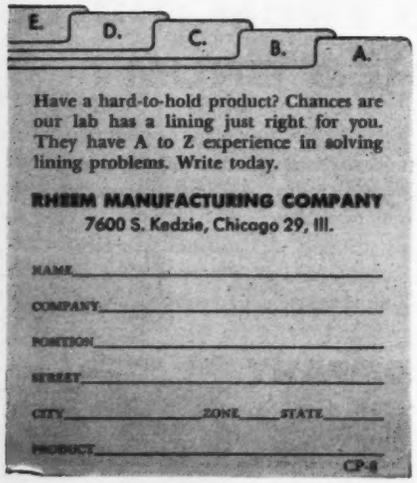
Shipment never *helped* a lined steel drum or a product. Everything works against them. High-speed clatter, jarring blows, quick shifts from hot to cold—an obstacle course all the way.

But punishment is nothing new to Rheem drums. They've been through it all before in Rheem laboratories. Our engineers learn from special test trips how to team linings with products, and how to best *apply* the linings. They learned long ago that *any* good lining starts with the steel.

Rheem blasts its steel drums under a hailstorm of high carbon steel shot. This physically scours and roughens the metal—cleans away scale, too—and leaves a sawtoothed, naked surface for linings to grip. In other words, they're *integrated* directly to the steel.

And Rheem learns more from planned abuse, like how to cure linings on drum bodies and on their tops and bottoms in separate ovens for the individual treatment their different shapes require.

Rheem will go on learning ways to build better containers, better linings, and better product protection. Keeping ahead of trouble is just part of never ending research that's made Rheem the world's leading producer of steel shipping containers.



YOU CAN RELY ON Rheem MANUFACTURING COMPANY

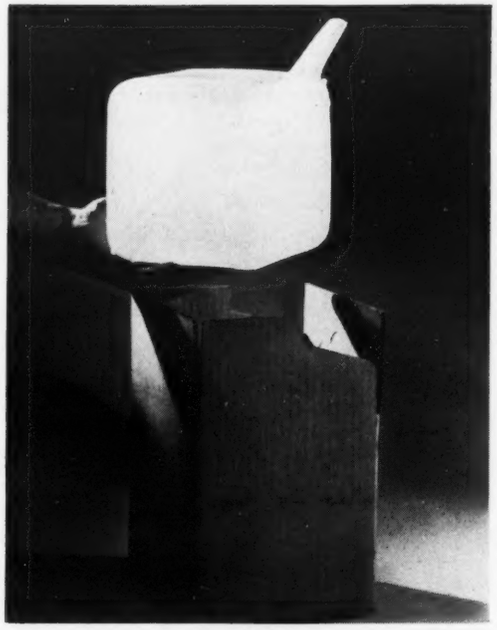
RICHMOND AND SOUTH GATE, CALIF.; HOUSTON, CHICAGO, NEW YORK, NEW ORLEANS; LINDEN, N. J. AND SPARROWS POINT, MD.

When inquiring check 7120 opposite last page

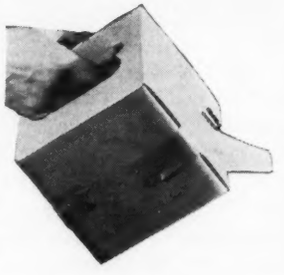
Containing acids, corrosives, shipper can double as dispenser

Cube-type container designed for one-way shipment consists of semi-rigid, cube-shaped insert formed of polyethylene and an outer carton of corrugated paperboard. Resistance of polyethylene to moisture and most chemicals enables unit to handle most any liquid or powder requiring protection from contamination, spoilage, corrosive action or moisture.

Cubical containers are light-weight and pack closely together, reducing shipping costs and necessary storage space. Packager receives units with inserts collapsed and stacked, cartons folded. Conventional packaging equipment can be used to inflate collapsed insert with air pressure, set up carton, and assemble the two. Filled by gravity or pressure, insert is closed by heat sealing end of spout, which folds flat as carton is sealed for shipment.



Container consists of polyethylene liner surrounded by corrugated carton



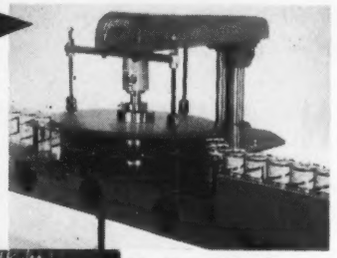
Consumer pulls open die-cut flaps in carton to form handle and expose spout, which is cut open

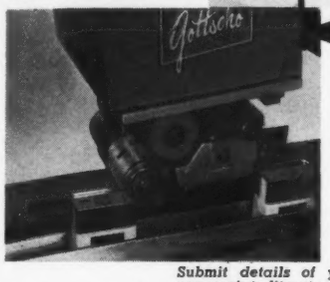
Coding Problem ?

There's a Gottscho automatic code-dating machine for every package, every purpose

Bottom-Coder

Portable space-saving unit imprints codes on bottom of jars, bottles, cans, etc. as part of an existing production operation. Imprint surface may be flat or concave, flush or recessed. Wheels right up to the line, can be moved about at will. ("Model TB" MARKO-CODER® IMPRINTER).





Top-Coder

Motor - driven imprinting attachment places code-dates, other changeable legends on top surface of round or rectangular cans, canisters, jar covers, cartons, boxes. Attaches to conveyor or packaging machine. Accurately positions imprints in any desired location. (ROLAPRINTER® "700" MACHINE)

Submit details of your coding problem for appropriate literature and our recommendation.

Gottscho **ADOLPH GOTTSCHO, INC.**

Dept. W, Hillside 5, N. J.

Automatic Production-Line CODING, MARKING, IMPRINTING MACHINES
In Canada: RICHARDSON AGENCIES, LTD., Toronto & Montreal

When inquiring check 7121 opposite last page

PORTABLE!
PRACTICAL!
PROFITABLE!

Union Special®

SUSPENDED HEAD

BAG CLOSING MACHINES

Portability, versatility, and simplicity of operation make Union Special Suspended Head Machines ideal for all-around bag closing operations in small plants, and well-suited for utility or stand-by duty in large plants. Users have found that machines can be used to produce neat, strong closures on virtually all types of paper or cloth bags. Initial cost is low; installation is simple and inexpensive. You can hang them up any place and go to work!

Send for this BULLETIN!

Get your copy of Bulletin No. 201 which illustrates and explains how *Union Special Suspended Head Bag Closing Machines* can supply the answer to bag closing problems in small plants and large operations. UNION SPECIAL MACHINE CO., 442 N. Franklin St., Chicago 10, Ill.

When inquiring check 7122 opposite last page

for pouring. Spout folds back into carton for storage.

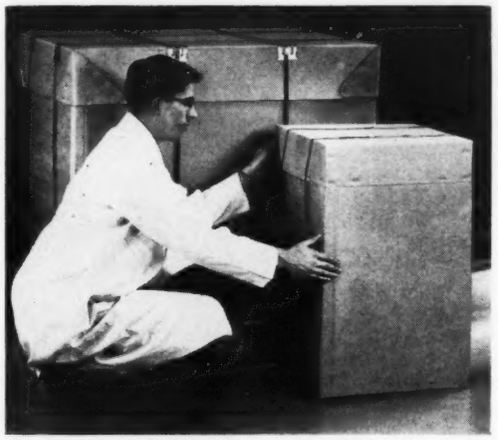
Available now in one quart or one gallon sizes, and soon a five-gallon size, units can be produced with snap-cap or screw-top spout closures, which fold flat into recess in container.

(Cubitainer is manufactured by Hedwin Corporation, Dept. CP, 1600 Roland Heights Ave., Baltimore 11, Md. Check 7123 opposite last page.)

Smaller size bulk containers offer packaging, shipping savings

Uses: Small size bulk container is designed for storage and shipping of various dry, granular chemicals, plastics, or other bulk materials.

Features: Rectangular box saves warehousing



No special closing machinery is required for bulk container. Filled pack is merely steel strapped

space as well as space and cost of shipping. Elimination of handling and bookkeeping involved in returnable containers can offer savings.

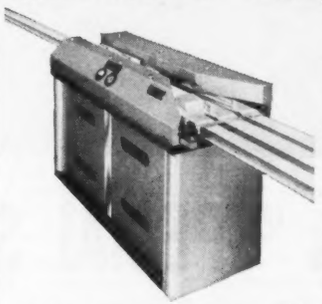
Description: Bulk container consists of two sleeves and a top and bottom lid. The inner sleeve slips into the bottom lid. Outer sleeve is then dropped over bottom lid and capped by top lid. No special closing machinery is required since the box is merely strapped in two directions when filled. No skids or pallets are needed.

Product to be shipped determines size of individual container. For example, small bulk pack used for shipping 200 lb of plastic pellets measures 20½ x 20½ x 30⅞ inches.

("Junior" bulk pack is product of Gaylord Container Corporation, Division of Crown Zellerbach Corporation, Dept. CP, 11 N. Fourth St., St. Louis 2, Missouri. Check 7124 opposite last page.)

are profits dribbling through your fingers due to inefficient package weighing?

SELECTROL weighs, sorts, and counts every package



Checkweighs every package right in your production line. Eliminates deliberate overfill to insure full weight. SELECTROL weighs in motion without spillage or interruption to production flow. Out-of-tolerance units are smoothly diverted to over and under weight channels, correct weight packages continue on without further handling. Rejection accuracy can be held to one gram, plus or minus, at speeds up to 100 per minute.

Constant checkweighing with SELECTROL, in contrast to occasional spot checking, provides more accurate control of processing and filling operations. Eliminates product waste and decreases manual labor required to make corrections.

Let our weight control specialists conduct a free survey of your weighing problem.

Sales and Service Coast to Coast

Exact Weight Scales

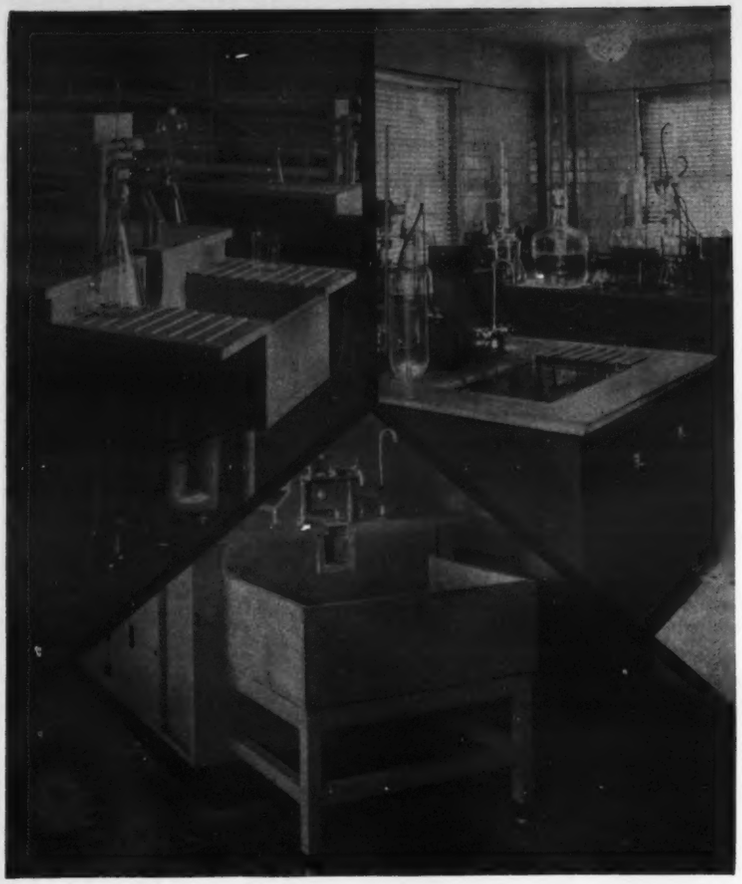
Better quality control
Better cost control

THE EXACT WEIGHT SCALE COMPANY

905 W. Fifth Avenue, Columbus 8, Ohio

In Canada: P. O. Box 179, Station S, Toronto 18, Ont.

When inquiring check 7125 opposite last page



Let's talk "SPECIAL SIZES"

The size and depth of sinks for laboratory and industrial use should be determined by the job they have to do — *and not by available standard sizes!*

With Alberene Stone sinks you can specify any size and depth — without paying a premium.

And with Alberene Stone you get — *the natural silicate stone with the surface that goes all the way thru.* Its all-silicate mineral components resist chemical attack. Low absorbency makes it essentially nonstaining. Discolorations can be removed by scouring or honing without harm to the surface.

For information and technical assistance, address: Alberene Stone Corporation, 419 Fourth Avenue, New York 16, N. Y.

ALBERENE STONE

provides LOW ABSORBENCY protection

When inquiring check 7126 opposite last page

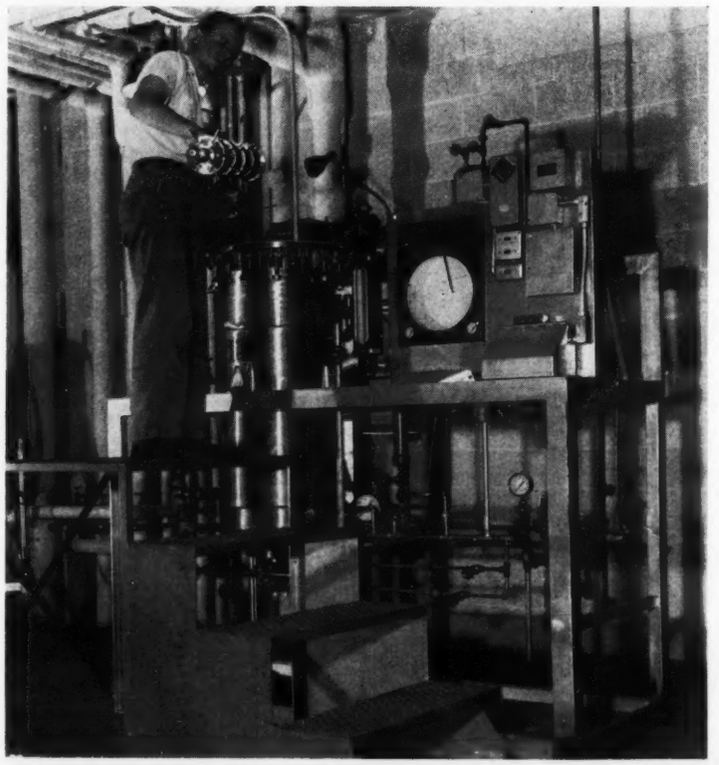
Many complications of operating pilot-plant fermenter are overcome by two-section shaft so that . . .

ONE MAN OPERATES PILOT FERMENTER

. . . without even occasional help

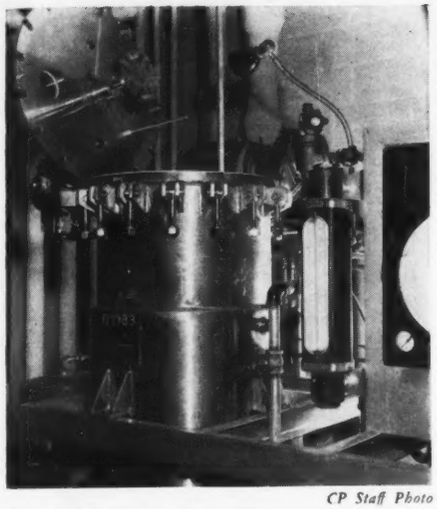
WILLIAM C. CLARKE, Assistant Editor

In common with many industrial pilot plant laboratories, a large midwestern school wanted a small scale vat fermenter that could be handled by one man without even occasional help. Various departments of the university are engaged in both fundamental and development research which requires small production lots of yeasts, molds, and bacteria. These are needed for further studies on isolation of enzymes and antibiotics, and to determine production efficiencies. In fact, there is a bio-engineering program under way at the university. Planners thought that if it could be handled by one man, the fermenter could also be used for individualized instruction in the under-



CP Staff Photo

Agitator can be removed manually from the vat without using an overhead crane



CP Staff Photo

Cover of fermenter with antifoam probe. Arrow indicates magnets for coupling

graduate and graduate schools.

Problem is typical of industrial pilot plant laboratories — especially those engaged in fermentation studies.

Since installing a stainless steel fermenter with a magnetic coupling device to allow splitting the agitator shaft, it has been possible to further develop the university program of research and development. Fermenter is a 30-gallon unit with a swing top cover, externally removable bottom bearing, and electronic antifoam control. One man can open the fermenter to clean, recharge, alter the number, positions, and diameters of agitaors, remove baffles, and make other changes without using an overhead crane. Time required to loosen head bolts, open cover, manually remove the complete agitator, and reassemble for sterilization is approximately ten minutes.

Closing the cover automatically engages magnetic coupling. Bottom bearing is used primarily to support the agitator shaft in a vertical position when vat is open. It also prevents whip during operation. Antifoam system controls addition of antifoam agent within 1%, either by predetermined additions or by probe demand. Electric counters keep track of amounts of antifoam added.

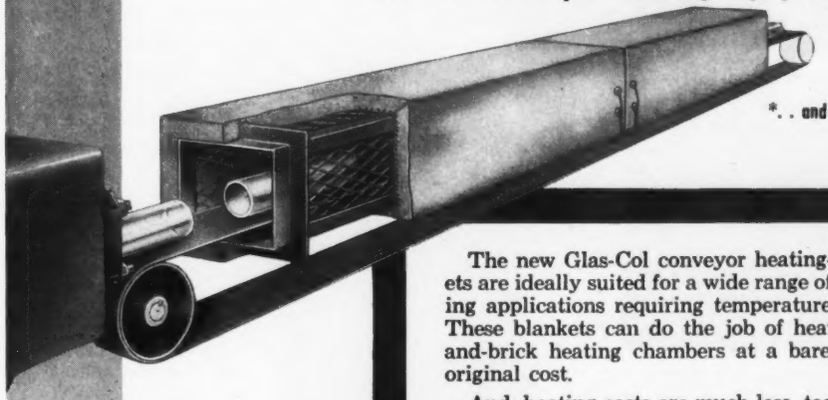
Fermentation product can be either the cells or "beer" broth. After filtration, product is separated by centrifuge and usually extracted with organic solvents. Fermentation is held under 5-10 psig. Unit is steam sterilized under 15 psig.

(Access-A-Bilt vat fermenter is product of Stainless and Steel Products Company, Dept. CP, 1000 Berry Ave., St. Paul 14, Minn. . . . or for more information reader may simply check 7127 on handy form opposite last page.)

. . for curing, annealing, tempering, roasting

NEW **GLAS-COL**

heating-chamber blanket slashes original cost* of conveyor heating equipment



*. . and operating cost, too!

The new Glas-Col conveyor heating-chamber blankets are ideally suited for a wide range of industrial heating applications requiring temperatures up to 600° C. These blankets can do the job of heavy, bulky, steel-and-brick heating chambers at a bare fraction of the original cost.

And, heating costs are much less, too! Specific applications of Glas-Col conveyor heating-chamber blankets include (1) curing rubber products, such as silicone rubber elastic threads, tubing and other shapes; (2) annealing and tempering various metal parts . . and also glass parts, such as bottles, TV picture tubes; (3) plastic products, such as extruded tubes, molding and gaskets; (4) drying and roasting granular materials, such as catalysts; and (5) roasting and drying a wide variety of foods.

Construction and Design: Glas-Col heating blankets can be engineered for belts of any width or length. For flexibility of manufacture, shipping, installation and maintenance, the blankets are built in multiple units . . each ranging from four to eight feet in length.

Heating elements, constructed of high-quality resistance wire imbedded in layers of glass fabric, are positioned so that the same temperature is maintained from left to right and front to back of the heating chamber.

For additional information, contact Glas-Col Apparatus Company, Dept. CP, 711 Hulman Street, Terre Haute, Ind.

GLAS-COL

Trademark Registered U. S. Patent Office

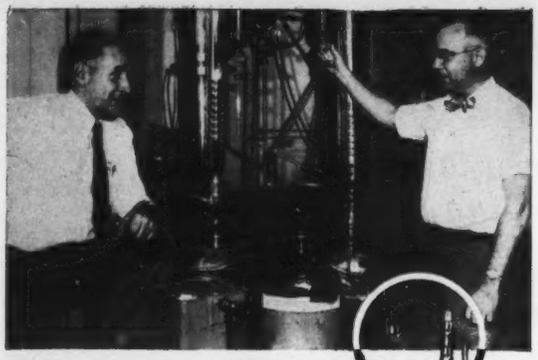
ELECTRIC HEATING MANTLES

U. S. Patent No. 2,282,078

U. S. Patent No. 2,231,506

Specialists in Laboratory and Pilot Plant Heating Problems

When inquiring check 7128 opposite last page



CORSON-CERVENY MICRO BELLOWS PUMP Feeds Chemicals in Esso Research Bench Scale Pilot Plant

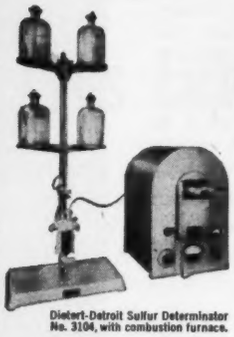
In setting up its bench scale pilot plant to solve many problems involving simple, continuous, or vacuum distillation, solvent extraction, or chemical reaction, Esso Research & Engineering have installed a Corson-Cerveny Micro Bellows Pump to pump a wide variety of chemicals.

The Corson-Cerveny Pump is used in many laboratories where corrosive chemicals are pumped because all parts in contact with the liquid are made of stainless steel, and cone-to-taper fittings eliminate the need for packing, which is always a source of possible contamination.

Why not let the Corson-Cerveny Pump help in your laboratories? Write for bulletin and prices.

RESEARCH APPLIANCE COMPANY
Box 307 Allison Park, Pa.

When inquiring check 7129 opposite last page



Dietert-Detroit Sulfur Determinator No. 3104, with combustion furnace.

FAST, ACCURATE SULFUR TESTING

with a DIETERT-DETROIT Sulfur Determinator

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FOR THE LABORATORY

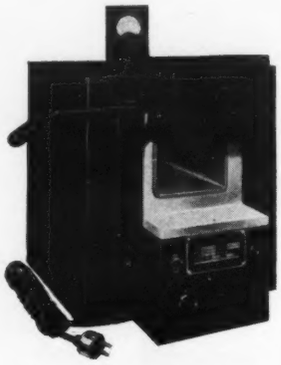
Has working temperature in continuous operation of 1700°F . . .

laboratory muffle furnace has heat-up time of one hour to 1800°F

Uses: For ignition of precipitates, gas determinations, incinerations, fusions, heat treating.

Features: Laboratory muffle furnace has pyrometer with built-in thermocouple incased in quartz tube for temperature control. Furnace is relatively low cost. Input controller maintains temperature at any desired point continuously.

Description: Switch, pilot light, input timer are built into base of furnace. Heat-up time is one hour to 1800°F. Maximum working temperature is 1900°F (1700°F continuous operation). Exterior of muffle furnace is steel finished in black wrinkle enamel. Insulation is 3" brick. One piece muffle is wound with nickel-chromium coils. Electrical rating is 1300 watts, 115 or 230 volts, single phase, AC. Interior size is 4¼ x 3 x 11". Exterior size is 16 x 19½ x 21".



Input timer is built into base of furnace

(Muffle Furnace is product of The Electric Hotpack Co., Inc., Dept. CP, Cottman Ave. at Melrose St., Philadelphia 35, Pa. . . . or for more information check 7131 on form opposite last page.)

Will hold any shaped sample, having one flat surface, for analysis . . .

eliminates alignment problems of spark technique in spectrum analysis

Uses: Holding any shaped sample as discs, bars, or small parts having at least one flat surface for spectrum analysis using spark technique.

Features: Petrey stand has finger touch release to load and unload electrodes rapidly. Tray at base of stand catches hot electrodes.

Descripton: Stand clamps on illuminating unit bed of manufacturer's current spectrographs. Sample to be analyzed is placed on stand platform and electrode is held below it. When current is applied, AC spark merely leaves a charred spot on surface of

made to measure

Every item in the Diamond D Blue Line will measure with maximum accuracy and uniformity. The graduations are calibrated with extreme care and the etching is deep and clear to afford maximum readability.

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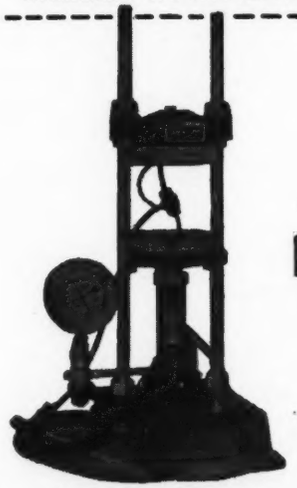

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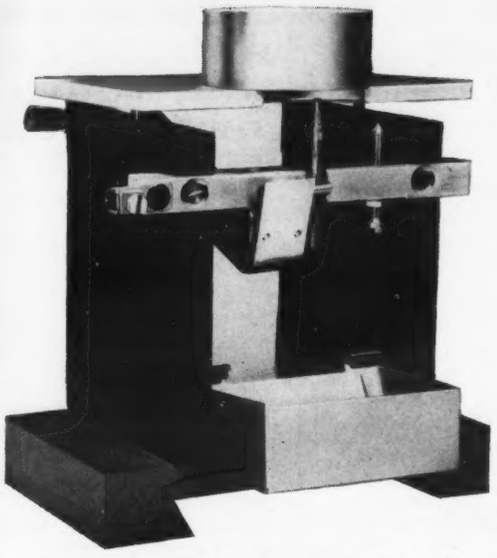

Sample to be analyzed is placed on platform with electrode below it

metal. Piece being analyzed need not be mutilated or destroyed.

Initial setting eliminates further alignment problems. Stand can be slid along track to desired position and clamped in place. Selected sample is then placed on spring-hinged platform, pressed down against lower electrode, and released automatically to make correct pre-determined spark gap.

(Petrey Stand is product of Bausch & Lomb Optical Company, Dept. CP, 635 St. Paul St., Rochester, N. Y. Check 7134 opposite last page.)

"How are things going?"

Above cartoon was sent in by Tom Sarvay, of the New Product Development Division of Diamond Alkali's Research Center.

Good coffee—the kind that attracts knowing truckers to their favorite roadside stops—depends on careful preparation, *and* maintenance at *just the right temperature until serving.* That's why manufacturers of restaurant coffee makers have consistently used Rochester Bimetal Dial Thermometers for years. They know RMC thermometers assure customer satisfaction by giving long, trouble-free, dependable service.

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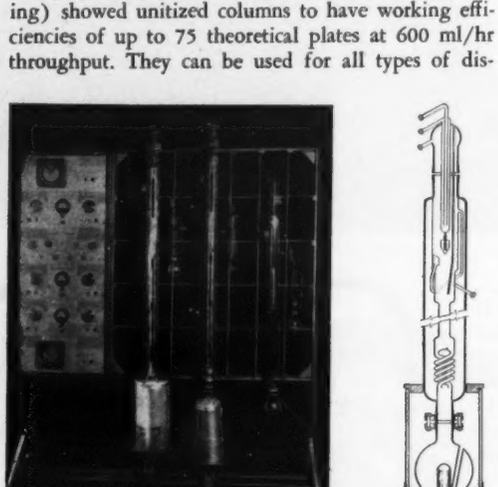
Build your own

custom designed still

Interchangeable units provide for fast assembly of distillation equipment for a particular job

Designed for effective operation on specific distillation problems without expensive and time consuming construction of equipment, laboratory distillation units are made up of interchangeable parts. Numerous special designs can be made up from stock units. Component designs have resulted from studies carried on with Doctor Fenske of Penn State.

Field tests of the distillation units with a mixture of methylcyclohexane and n-heptane (with Fenske packing) showed unitized columns to have working efficiencies of up to 75 theoretical plates at 600 ml/hr throughput. They can be used for all types of dis-

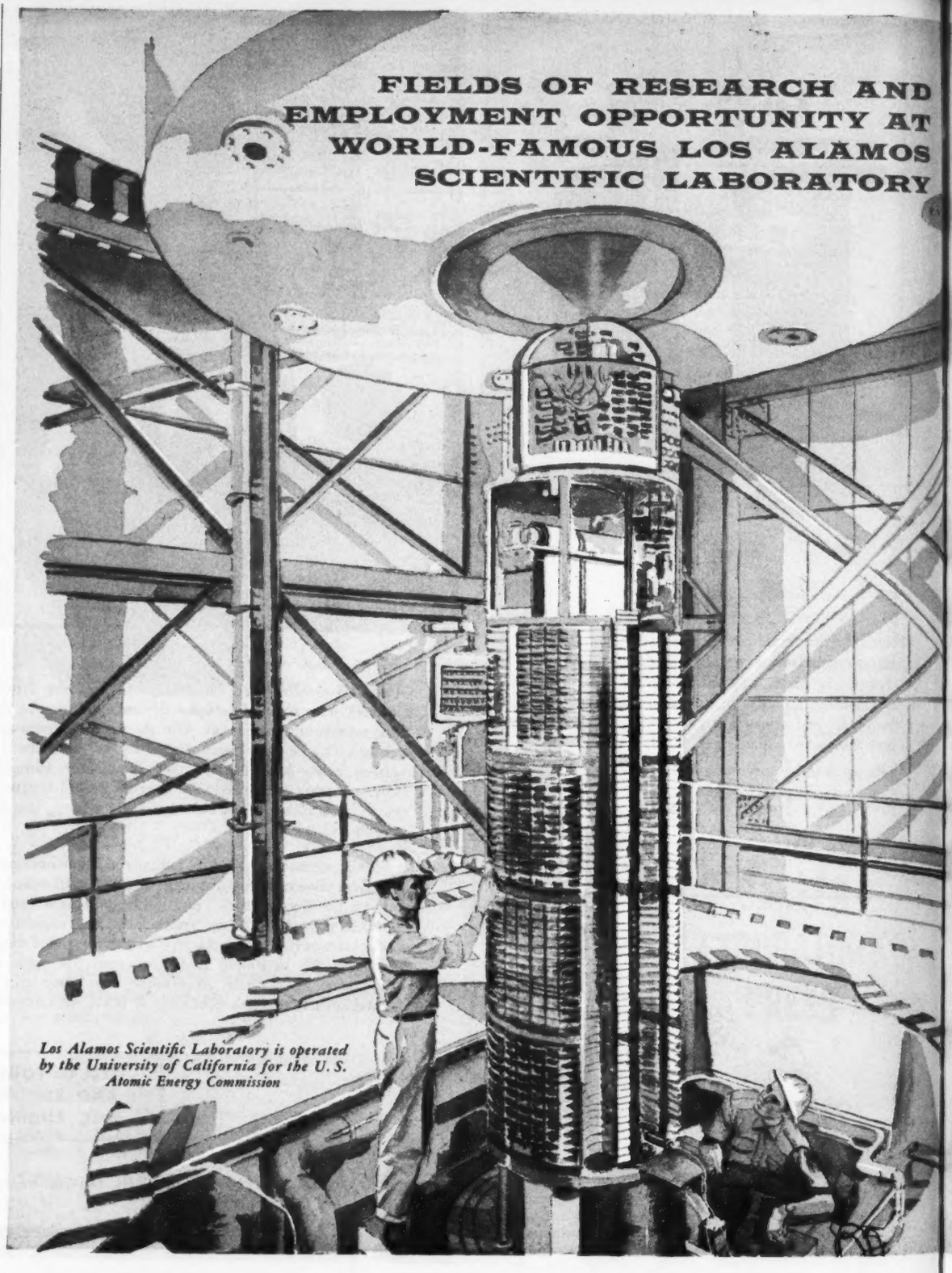


Picture at left shows organic laboratory distillation unit set up in four hours. Cross section at right is typical of one still column

tillation in the 50-250°C range and to temperatures above 350°C under reduced pressure. Entire operation is run from a single bank of interchangeable electrical controls.

To build any dsitillation unit, interchangeable parts are selected for column, still head, still pot and heater, receiver, support rack, and controls. Organic laboratory assembly illustrated was assembled in four hours using only a wrench and screwdriver. All glass parts are made of Pyrex-brand borosilicate glass.

To remove distillate from the column and control reflux rate, a unique swinging funnel arrangement is employed. Glass funnel hangs from adjustable platinum hook under condenser. It catches distillate and passes it back to the packing. When solenoid outside the column is energized, permanent magnet sealed into the funnel causes it to swing over to a take-off line. Automatic timers are used to control reflux rate.


FIELDS OF RESEARCH AND EMPLOYMENT OPPORTUNITY AT WORLD-FAMOUS LOS ALAMOS SCIENTIFIC LABORATORY
Los Alamos Scientific Laboratory is operated by the University of California for the U. S. Atomic Energy Commission

Theoretical Physics and Mathematics
In the field of theoretical physics, the Laboratory carries on studies of nuclear theory, equations of state, mathematical analysis methods, hydrodynamics problems and various aspects of applied mathematics. The Theoretical Division is also concerned with the conceptual design of nuclear weapons, and supports many non-weapons activities such as the nuclear reactor and propulsion programs. The equipment used includes the Los Alamos-developed Maniac, the Maniac II, two IBM 704's and an IBM 701.

Experimental Nuclear Physics
Much of the work in experimental physics is concerned with nuclear properties of various materials. Fundamental studies are made of nuclear forces, neutron and charged-particle reactions and cross sections. Experimentation in controlled thermonuclear reactions is assuming increasing importance. Among the facilities available are three Van de Graaffs, two Cockcroft-Walton machines and a variable energy cyclotron.

Electronics and Instrumentation
The Laboratory is engaged in the design and development of nuclear physics research instruments, scintillation counters, fast pulse amplifiers, multi-channel analyzers, fast oscilloscopes, radiation detection instruments, electronic controls and control systems, and high-speed cameras which operate at 15 million frames per second. Electronics specialists also assist in the design of digital computers and of instruments for studying nuclear and thermonuclear detonations.

Nuclear Reactor Research
In connection with the peacetime applications of nuclear energy, the Laboratory is currently developing several advanced power reactors of unusual design. In addition, two research reactors are available for experimental studies. The remotely controlled critical assembly machines, known as Topsy, Godiva and Jezebel, constitute neutron research tools of a unique character.

Nuclear Propulsion
The Laboratory is actively engaged in the application of nuclear energy to the new and challenging field of self-propelled mobile reactors. There are studies in progress relative to engine design, heat transfer, controls and instrumentation.

Chemistry
Research in chemistry is devoted largely to inorganic and physical studies, especially of materials such as uranium, plutonium, deuterium and tritium used in nuclear energy systems. Radiochemical methods are applied in various investigations. Much work is being done on reaction kinetics, the effects of radiation on chemical reactions, complex ion formation and the determination of heats of combustion and solution. Extensive analytical studies include the use of a great variety of instruments, as well as the techniques of microanalysis.

Metallurgy and Metallurgical Engineering
Research activity and development in this field includes investigation of the metallurgical properties of materials used in nuclear energy systems; studies of extremely refractory substances, ceramics, cermets and plastics; the behavior of materials under extremely high temperatures and high pressures; studies of the properties of plutonium and its alloys, with increasing reference to their use in reactors, and of uranium and its alloys; development of fabrication techniques for various metals and alloys; and the high temperature properties of refractory metals tungsten, molybdenum, columbium, etc.

Weapons Physics, Design and Testing
Still the nation's principal institution for nuclear and thermonuclear weapons research, the Laboratory takes nuclear weapons from the concept stage to proved performance as determined by field tests. Activities in weapons research and development include the mechanics and dynamics of initiating a nuclear energy release; the behavior of supercritical systems; the testing of nuclear devices and weapons assemblies in Nevada and in the Pacific; engineering design of tests and prototypes of nuclear systems; and the design and development of nuclear weapons components and the techniques for their manufacture.

Explosives Research and Development
Work in this field includes study of fabrication, storage and stability problems of explosives; making and evaluating novel organic chemical compounds of possible use as explosives; mechanics and dynamics of explosive phenomena; and physical and chemical properties of explosive material using mass spectrometer, infra-red spectrometer, X-ray equipment and other analytical techniques. High explosives are employed in research on equations of state and shock wave phenomena.

Mechanical Engineering
Design and development work is carried on in connection with weapons design, field test facilities, the power reactor and propulsion programs, servo-mechanisms and remote control systems. High explosives systems are designed and manufactured. Other types of work are estimating, cost analysis and liaison between architectural engineers and contractors.

Chemical Engineering
Chemical engineering work includes studies of heat transfer, fluid flow, solvent extraction, evaporation, distillation and systems at extreme temperatures and pressures. Problems supporting inorganic and physical chemistry research projects are also undertaken. Other activities are the remote control handling of radioactive materials and corrosion and erosion studies.

Electrical Engineering
Much effort is devoted to the design of induction heating systems for study of alloys at extremely high temperatures; of DC power supplies at currents up to 100,000 amperes; of servomechanism controls for nuclear reactors; and of high magnetic field systems. Work is done in planning, building and installing power distribution systems and their controls.

The Laboratory now has staff openings for technically qualified people interested in these fields of research and development. For additional information address your inquiry to

Director of Personnel
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Aluminum heat shields are used within the columns. They are electrically heated to maintain adiabatic conditions in the column.

(Unitized distillation apparatus is a development of Fisher Scientific Co., Dept. CP, 303 Forbes Street, Pittsburgh 19, Pa. . . . or for more information reader may simply check 7136 on form which is located opposite last page.)

Plastic graduated cylinders will withstand many acids, bases — won't break . . .

should *not* be used for ketones, esters, aromatic hydrocarbons, or concentrated acids or bases

Uses: In research, testing, and control laboratories as liquid volume measuring device.

Features: Graduated cylinders are plastic and will not break under ordinary use.

Description: Graduates are precision made from clear transparent plastic material chemically inert to many acids and bases, other materials. Restrictions on use are that the graduates should not be used with liquids at temperatures above 90°F or with concentrated alkalis, ketones, esters, or aromatic hydrocarbons.

Illustrates clarity of plastic cylinders

(Plastic graduated cylinders are a product of Paprex Co., Dept. CP, P.O. Box 65, Needham, Mass. . . . or for more information reader may simply check 7137 on the convenient Reader Service slip which is located opposite last page.)

Shows how X-ray techniques solved metal problems

One-page reprint shows how X-ray diffraction was used to solve riddle of pinholes in aluminum foil and improper rolling texture in aluminum alloy. Material also covers X-ray diffraction treatment of corrosion, welding, catalysts, and other research.

"Electronic Sleuth" is issued by Research & Control Instruments Div., North American Philips Co., Inc., Dept. CP, 750 S. Fulton Ave., Mount Vernon, N. Y. When inquiring specify 7138 on form opposite last page.

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briefs

from contemporary publications

Bubble-cap tray design

Old and new methods of designing bubble-cap trays are illustrated. Some attention is given to cost evaluations. Twelve pages, six tables, ten figures. (*"Petroleum Processing," May* 1956, *page* 109.)

Heat transfer

Heat transfer coefficients for liquid hydrocarbons can be estimated from equations and a chart. Three pages, one table, one figure, six references. (*"Petroleum Refiner," May* 1956, *page* 227.)

Right-to-work laws

Eighteen states have passed right-to-work laws so that a man can work without first joining a union. This paper explains the laws and tells why the unions are against them. Five pages, two figures. (*"Mill and Factory," April* 1956, *page* 77.)

Packaged heat pumps

This detailed discussion of how to achieve economies in installation and operation of packaged heat pumps includes instructions in necessary computations for estimating operating loads and costs. Seventeen pages, one table, 20 figures. (*"Air Conditioning, Heating, and Ventilating," May* 1956, *page* 89.)

Nuclear power plant

Design of a nuclear power plant is considered under headings of coolant flow, fuel elements, and reactor vessel. Four pages, four figures. (*"Power," May* 1956, *page* 90.)

Effects of cold working aluminum

Cold work itself does not affect rate of corrosion of aluminum in hydrofluoric acid and in solutions of barium hydroxide, but may favor formation of cracks which increase rates of dissolution. Six pages, three tables, two figures, 34 references. (*"Corrosion," April* 1956, *page* 177t.)

Heat transfer at altitudes

Problems in heat transfer at simulated altitudes are solved by means of charts and equations. Six pages, five tables, six figures, 21 references. (*"Refrigerating Engineering," May* 1956, *page* 39.)

Polyethylene paper

Physical properties of paper coated with polyethylene by extrusion are presented and various tests are described. Six pages, four tables, five figures. (*"Tappi," May* 1956, *page* 324.)

Sorption characteristics

A study of water sorption characteristics of activated alumina, silica gel, and anhydrous calcium silicate is reported. Various types of activators are covered. Five pages, three tables. (*"Refrigerating Engineering," April* 1956, *page* 34.)

Position classifications

This study of position classifications is intended for use by professional engineers. Various grade levels are defined. Five pages. (*"American Engineer," May* 1956, *p.* 25.)

abstracts of pertinent articles in other industrial publications . . . selected by CP editors as a service to you . . .

Plastic pipe tests

Experiments in California with plastic pipe are reported. Operating conditions, types of water, difficulties, tastes, odors, and unusual results are all considered. A three-page discussion is appended. Six pages. (*"Journal of the American Water Works Association," April* 1956, *page* 388.)

GRS and antioxidants

Properties of GRS as affected by antioxidants are discussed and illustrated. Attempts to measure changes in polymer branching were unsuccessful. Six pages, one table, 10 figures, four references. (*"Rubber Age," May* 1956, *page* 267.)

Air conditioning

High velocity air conditioning for offices, factories, hotels and banks is described in adequate detail. Three pages, four photographs. (*"Heating, Piping and Air Conditioning," May* 1956, *page* 108.)

Maintenance

How to maintain stock preparation in the pulp mill is discussed, with attention to pulper drives, jordans, bearings, pumps, agitators, and lubrication. Three pages. (*"Paper Trade Journal," May* 28, 1956, *page* 22.)

Service hot water

To help engineers design service hot water systems for industrial use, this paper covers economics of hot water utilization, proper installation, waste in hot water systems, combustion characteristics of fuels, and piping problems. Fourteen pages, 22 tables, 14 references. (*"Air Conditioning, Heating, and Ventilating," April* 1956, *page* 82.)

Vitamins D_2 and D_3

Quantitative estimations of vitamins D_2 and D_3 or their mixtures is based on formation of colored reactions products when the sample is treated with furfural and sulfuric acid. Conditions must be carefully controlled. Three pages, one table, four figures, seven references. (*"Analytical Chemistry," May* 1956, *page* 817.)

Vapor-liquid sampling

A spectrophotometer combined with a modified Othmer still is used for continuous analysis of vapor samples and flashed liquid samples. Five pages, two tables, three figures, three references. (*"Industrial and Engineering Chemistry," May* 1956, *page* 956.)

Plastic water pipe

Plastic pipe for underground transmission of cold drinking water does not make such water toxic, unpalatable, or unsightly, nor add to difficulty in disinfecting new lines or in maintaining chlorine residuals. Five pages, three photographs. (*"Modern Plastics," April* 1956, *page* 166.)

Austenitic piping

This is a summary of opinions and experience in connection with the application of austenitic stainless steels in steam power practice. Four pages, four tables. (*"Combustion," May* 1956, *page* 67.)

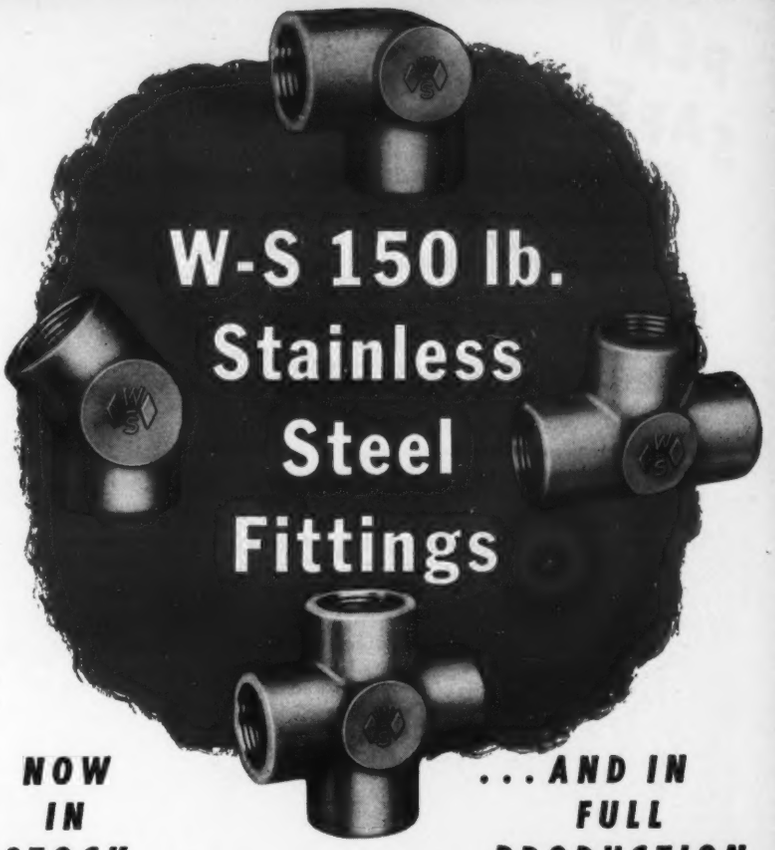

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Fig 1—Operator bleeds air into measuring tank, expelling excess bleach through overflow return to concrete storage tank. When tank empties to desired level, he'll shut off vent valve, leaving tank under pressure. Note how badly the iron valve (left) has been corroded by the bleach. PVC line at right is in good condition

CP Staff Photo

Formerly it took two men ½ to one hour to measure and add bleach solution to paper pulp beaters. Now with tank and piping setup

One man adds bleach in ten minutes

Corrosive action of 15% sodium hypochlorite is thwarted through use of rigid polyvinyl chloride pipe and tank lining

FRANK E. McELROY, Assistant Editor

With **J. B. PICKERING,** Mill Superintendent

The Thomas Phillips Company, Akron, Ohio

Problem: Two operators used to take from ½ to one hour to tediously measure 75 to 150 gallons of bleach from a portable tank to paper pulp beaters, at The Thomas Phillips Company, manufacturer of quality paper and paper shipping sacks for the chemical and food industries.

Bleach is a 15% solution of sodium hypochlorite. It is used to bleach pulp that is later made into white paper, and to brighten pulp used in light colored papers. The bleach solution is very corrosive to many materials.

Solution: Thomas Phillips Company decided to pipe the bleach to the beaters. In January 1955 a 150-gal measuring tank was installed immediately below the existing concrete bleach storage and mixing tank (see Fig 1). The measuring tank was of cold rolled steel, lined with Koroseal, flexible polyvinyl chloride-based material.

Pipe lines made of one inch (IPS) High Impact Rigid Koroseal pipe were placed under floor and connected to the four beaters. Right at the beater,

Fig 2—Operator at paper pulp beater opens valve on bleach line, adding measured amount to the slurry. (Larger pipes and valves are for adding pulp slurry)

CP Staff Photo

size was reduced to ¾ inch (IPS).

A vent return and an air pressure line to the measuring tank were made from the ½ inch rigid PVC pipe. A total of 330 ft of 1 inch and ¾ inch pipe, and 50 ft of ½ inch Koroseal pipe were used. Vent overflows to concrete storage tank. Air line is under 6 to 9 psig pressure.

Measuring and feed system works this way. Operator closes diaphragm valve between storage tank and measuring tank. He then turns on the air line to this tank to force level of tank down until exact amount is in the tank (Fig 1). Extra bleach returns to storage through the vent overflow. When the required amount is left in the tank, vent line is closed and tank is placed under pressure. Air line is then shut off. Using this procedure, the measuring accuracy is about ±1%.

At the beater, operator opens the bleach outlet valve (Fig. 2). Air pressure in measuring tank forces all bleach from tank and pipeline to beater.

Results: Biggest saving is in handling time. Where before it took two men about one-half to one hour to measure and add the bleach to the beater, it now takes one man about ten minutes to do it. This is an 80 to 90% time saving.

The rigid Koroseal pipe and tank lining are completely inert to action of the bleach solution. They are proving very satisfactory.

(Rigid Koroseal pipe and tank lining are products of The B. F. Goodrich Industrial Products Co., Dept. CP, Marietta, Ohio . . . or for more information check 7142 on form which is located opposite last page.)

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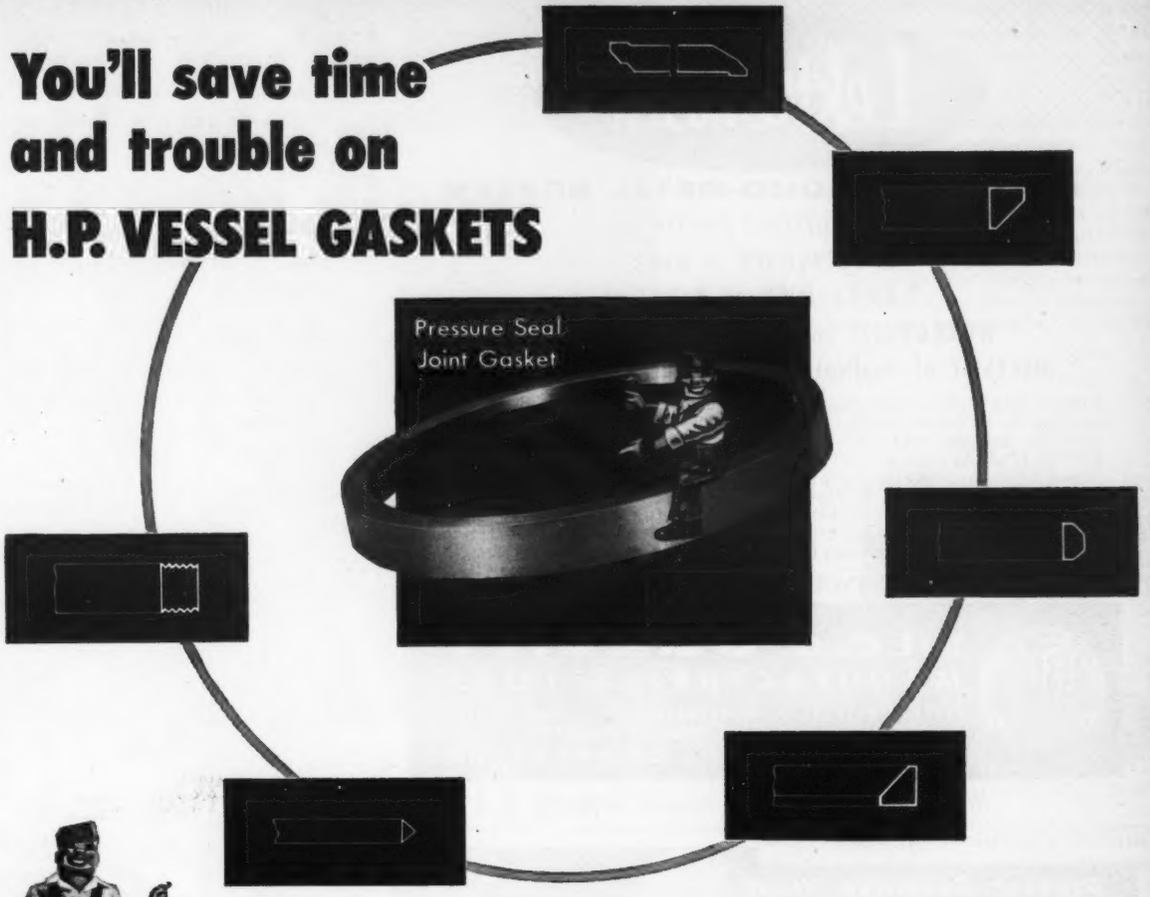

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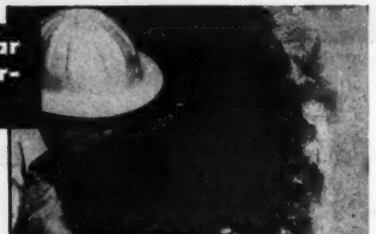
When inquiring check 7144 opposite last page

Prevent Excessive Wear to Vessel Liners by Armoring them with . . .



KLEMP HEXTEEL and FLOORSTEEL

Hexteel and Floorsteel are carbon or stainless steel armors and retainers for castable refractory monolithic linings. They prolong the life of an installation by retarding abrasive and corrosive action! Our engineering department is prepared to design your total lining requirements. Speedy delivery guaranteed!

Write for your **FREE** copy of "Serving the Oil Industry for Over 40 Years."

KLEMP METAL GRATING CORP
6601 South Melvina Avenue
Chicago 38, Illinois

KLEMP METAL GRATING CORPORATION CP
6601 South Melvina Avenue, Chicago 38, Ill.

Gentlemen:
Kindly send me literature describing Hexteel and Floorsteel applications in the petroleum and chemical industries.

Name_____
Firm_____
Address_____
City_____ Zone____ State____
Phone_____

When inquiring check 7145 opposite last page

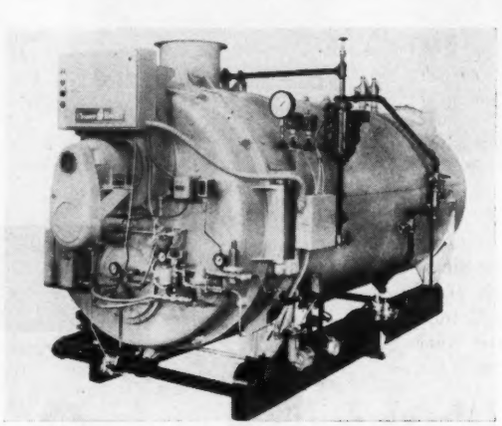
Davited front and rear doors ease tube removal, cleaning in packaged boiler . . .

tube sheets and tubes are quickly accessible without removing heavy-duty refractory

Uses: Provide industrial heating in 200 hp range.

Features: Front and rear doors of packaged boiler are davited. Doors may be swung open after removing a few bolts at each end. Tube sheet and tubes are accessible for cleaning without removing heavy-duty refractory.

Description: Units are available for use with light oil, oil and gas, or straight gas. Totally enclosed control panel is located at operator level and contains burner relay, blower-motor starter



Boiler's operation is safe, quiet, and automatic

and control switches. Controls are designed for ease of operation, maintenance, and reliability, and meet all Underwriters Laboratories, Factory Mutual and Factory Insurance codes. Boilers are fiber glass insulated and covered with 16-gage metal lagging.

(CB 200 packaged boiler is product of Cleaver-Brooks Co., Dept. CP, 326 E. Keefe Ave., Milwaukee 12, Wis. . . . or for more information check 7146 on form opposite last page.)

don't look now —

. . . but this magazine you are reading, CHEMICAL PROCESSING, comes to you without subscription price. Why?

Read what the Editors say on page 122.

THINKING OF CUSTOM FABRICATED

✓ **PRESSURE VESSELS?**
✓ **ALL TYPES OF STORAGE VESSELS?**
✓ **STACKS?**
✓ **PIPING?**
✓ **SPECIAL WELDMENTS?**
✓ **FIELD CONSTRUCTION?**
✓ **OTHER STEEL PLATE PRODUCTS?**

Better Contact Us Today!

The YOUNGSTOWN STEEL TANK COMPANY
Youngstown, Ohio

When inquiring check 7147 opposite last page

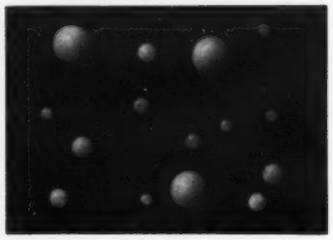
Precision balls of nylon accurate to ± 0.002" on diameter . . .

sphericity is ±0.001" on sizes from ⅛ to ¾"

Uses: Applications include use in bearings, pumps, check valves, and instruments.

Features: Accuracy on precision balls, fabricated from type FM-10001 nylon, is ±0.002" on diameter and 0.001" on sphericity. Balls are available from stock in 14 standard sizes from ⅛ to ¾".

Description: Desirable characteristics of nylon which balls possess include corrosion and wear resistance and lightness in weight.

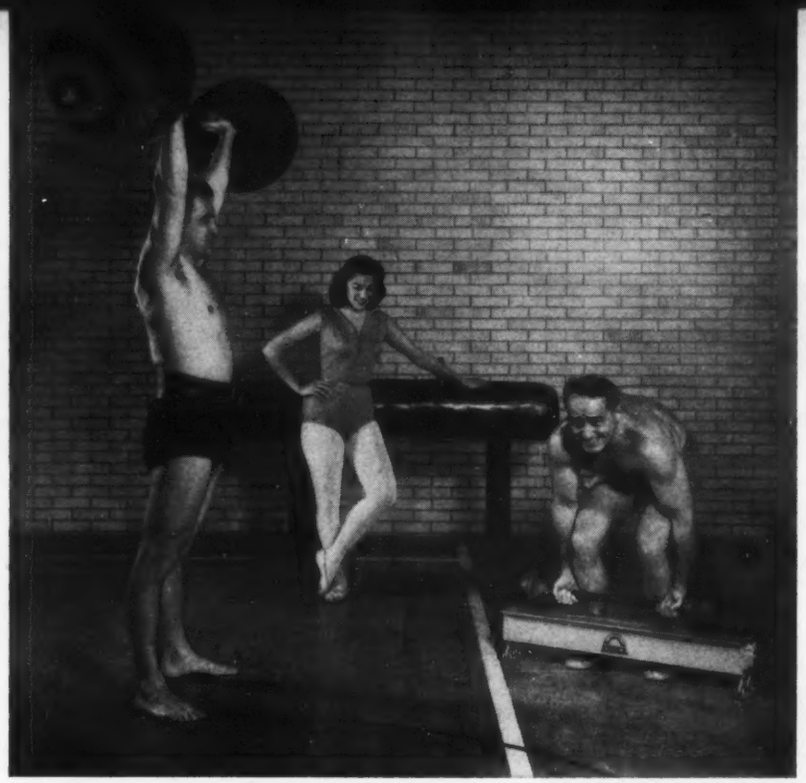


Precision nylon balls are available in 14 sizes from ⅛ to ¾"

Physical Properties	
Tensile strength psi (at 77°F)	10,900
Modulus of elasticity psi (at 77°F)	40,000
Shear strength psi	9600
Hardness Rockwell "R"	118
Coefficient of thermal expansion °F	5.5×10^{-5}
Deformation under load % (122°F, 2000 psi)	1.4
Heat distortion temp °F at 264 psi	170
at 66 psi	400
Water absorption %	1.5
Specific gravity	1.14

(Nylon balls are available from Industrial Tectonics, Inc., Dept. CP, Ann Arbor, Mich. . . . or for more information check 7148 on form opposite last page.)

For more information on product at right, specify 7149 . . . see information request blank opposite last page.

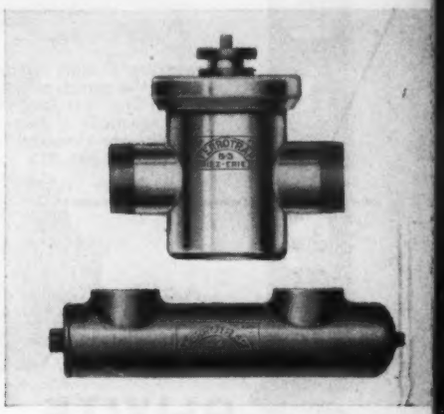


MAGNET MOCKS MIGHTY MUSCLE-MAN! This rugged weight lifter is certainly no "97 lb. weakling" but no matter how he grunts and groans he'll never be able to lift this weight. It's held in place by a HI-POWR Alnico V magnet bolted to the floor. (The weight was finally broken from the magnet's attraction by two strong men using hardwood pry-bars). This idea of herculean power has found a practical application in industrial processing lines, where magnetic separators are used to remove dangerous tramp iron before it causes machinery damage, fires or product contamination. *All Eriez Magnets are non-electric, self-contained. They operate without any wires or attachments. Their magnetic power lasts a lifetime. The first cost is the only cost.*

MAGNETIC IDEAS FROM

ERIEZ HI-POWR MAGNETIC SEPARATORS · ERIEZ HI-VI VIBRATORY EQUIPMENT

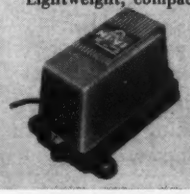
ERIEZ



ERIEZ MAGNETIC FERROTRAPS (PIPELINE TRAPS). Utmost protection against unwanted iron damage and iron contamination for almost all materials flowing through pipelines. New design offers three to four times more magnetic area than previous traps, effectively catches larger pieces of stray metal as well as microscopic fines. Invaluable for protecting expensive equipment; a "must" where product purity is of prime importance. Model B, (above, top) has stainless steel housing, and is available in standard or sanitary models. Model L, bronze housing, is standard model only. Ferrotraps are quickly installed, easily cleaned and can be used in any position. Withstand high pressures.

New! HI-VI electro-permanent magnetic vibratory equipment

First complete line of electro-permanent magnetic vibratory equipment operating at 3600 CPM directly off an AC line. No rectifier needed! . . . just plug in. HI-VI units provide greater vibratory output with less power consumption . . . give superior performance at reduced costs. Speed production. Permanently powered Alnico V magnetic element results in exclusive "double action" drive for greater productivity. Lightweight, compact, easily installed. *HI-VI Vibratory Feeders* give accurate, controlled feed to bulk materials . . . convey, spread, agitate, blend, cool, mix, etc. *HI-VI Unit (Bin) Vibrators* (self-adjusting) keep materials pouring freely and evenly through hoppers, bins, chutes, etc. Prevent pile-ups, arching, bridging. Write for complete HI-VI literature.

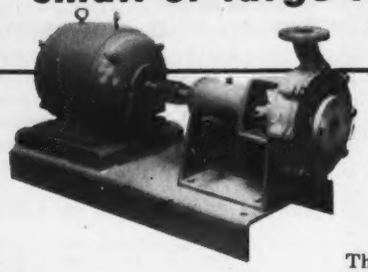


HI-POWR PLATE MAGNET PROTECTS PRODUCT PURITY. At the Newark, New Jersey, plant of the Serutan Company, a system of Eriez permanent-powered magnetic separators is used to assure product purity and to protect expensive machinery from tramp iron damage. The Eriez Plate Magnet shown here is installed in a gravity flow line leading from a mixer to the pellet mills, and is daily trapping unwanted pieces of tramp iron, as well as ferrous fines. The efficiency of the Eriez Magnets, according to plant officials, has far surpassed expectations.

Eriez' free booklet "Magnetic Ideas" can help you. Send for it without obligation,* ERIEZ MANUFACTURING COMPANY, *73H Magnet Drive, Erie, Pa. OR on your specific request Eriez factory-trained field men backed by Eriez' laboratory and engineering know-how, will be happy to study your your particular problem, make a plant survey and offer helpful "Magnetic Ideas".

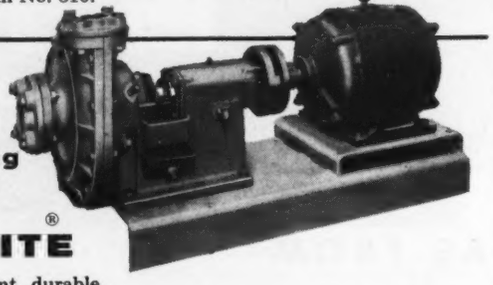
DORR-OLIVER PUMPS

for highest operating efficiencies in handling small or large flows —



OLIVER TYPE L Centrifugal Pump

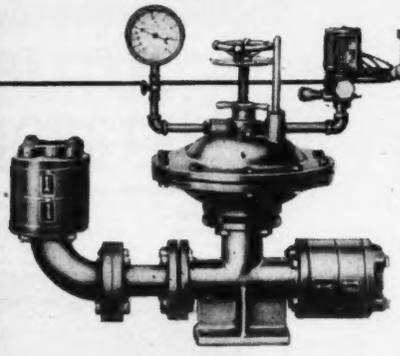
The Type L is a corrosion resistant chemical pump featuring a high cut-water or tongue of the volute. This makes the pump self venting . . . improves priming. Available in four standard sizes — 1", 1¼", 1½" and 2". Contact parts are made of Alloy 20 or Type 316 stainless steel, bronze or cast iron. 1" model in Alloy 20 stainless steel only. Write for Bulletin No. 310.



Acid Handling Pump

OLIVITE®

An efficient, durable pump for handling hot or cold corrosive solutions. Special rubber or neoprene base composition lines casing, cover and impeller. It does not crack or slough off even under high temperatures. Sizes available — 1¼", 2" and 4". Write for Bulletin No. 308-R2.



OLIVER Diaphragm Slurry Pump

This pump is designed to operate without mechanical linkage for transmitting force to diaphragm — source of power is compressed air. There is no motor, stuffing box or packing. Capacity quickly changed from zero on up without stopping operations. Pump is ideally suited for handling slurries containing fragile crystals or floc. Six sizes available. Write for Bulletin No. 309-R.

Dorr-Oliver engineers, specialists in pump applications, will gladly discuss your pumping problems. Write for their assistance.

DORR-OLIVER
INCORPORATED
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U.S.A.

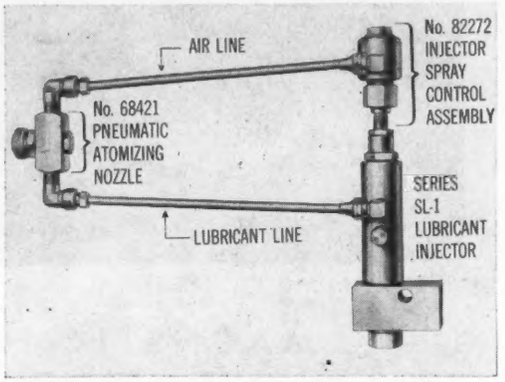
When inquiring check 7150 opposite last page

Applies controlled quantity of lubrication to gears, chains, or rollers . . .

device gives uniform, automatic spray of premeasured volume of liquid

Uses: Lubrication of open gears, chains, cams, rollers, and similar surfaces.

Features: Device automatically applies a controlled, pre-measured quantity of mist lubrication at pre-set time intervals, when used in conjunction with company's time-clock controlled centralized lubrication systems.



Device applies mist lubrication, paint, glue, or similar material on open surfaces

Description: Units may be used to apply lubricants, paint, glue, and similar materials on production lines. They provide positive, uniform, automatic lubrication without waste and reduce fire and accident hazards.

(MistOmatic spray control is a product of Industrial Div., Lincoln Engineering Co., Dept. CP, 5780 Natural Bridge Ave., St. Louis 20, Mo. . . . Check 7151, opposite last page.)

Welding of pipelines in service at 1500 psi, 1000°F now possible . . .

asbestos-mica packing ring used in coupling permits high-temperature use

Uses: As a pipeline safety-welding coupling on crude oil, gas, gasoline, asphalt, steam, chemical process, and other pipelines. Unit joins pipe so flow can be resumed immediately at full pressure.

Features: Asbestos-mica packing rings have undergone pressures of 1500 psi at 1000°F. Pressure-temperature applications may be determined by the ratings of standard codes for mild carbon steel pipe.

CHEMPRO Teflon*-Asbestos PACKINGS

Chempro Teflon impregnated asbestos packings provide the chemical resistance of Teflon and at the same time have the strength and resilience of asbestos. They are far superior to conventional lubricated asbestos packings, since the Teflon gives protection from chemical attack to the asbestos.

CHEMPRO STYLE 500 PACKING is designed for pumps and equipment handling hydrocarbons, light solvents and other volatile products. *Do not use on acid or strong caustics.* It is composed of 85% white asbestos yarn square plaited and thoroughly impregnated with Teflon.

CHEMPRO STYLE 600 PACKING is designed for applications handling acids, strong caustics and other corrosives. It is made of 100% Blue Cape asbestos, square plaited and thoroughly impregnated with Teflon.

Chempro Teflon impregnated asbestos packings are available in standard sizes from ⅛" up to 1¼", by 1/16", either on spools by the pound or in die molded or mandril cut rings or ring sets.

Ordering Information for Rings and Ring Sets

1. Give shaft diameter and stuffing box bore and depth.
2. Number of rings required.
3. For standard equipment, specify make and serial number.
4. State if seal cage is used.

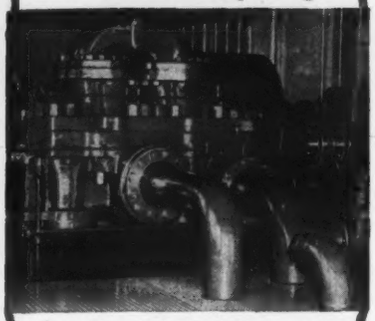
THE ORIGINAL FABRICATORS OF TEFLON PACKINGS AND GASKETS

*duPont Trademark

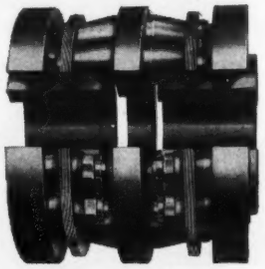
CHEMICAL & POWER PRODUCTS, Inc.
9 Broadway, New York 4, N.Y.

When inquiring check 7152 opposite last page

PROTECT YOUR PUMPS with THOMAS Flexible Couplings



One Chemical Engineer reports he formerly spent 95% of his time supervising repacking of pump glands. Then he installed Thomas Flexible Couplings. Now his pumps need no attention.



Only THOMAS Flexible Couplings offer:

UNDER LOAD and MISALIGNMENT

1. No Cross-pull on Bearings or Gland.
2. No End-thrust on Bearings or Impeller.
3. Freedom from Backlash—Torsional Rigidity
4. Free End Float
5. Smooth Continuous Drive with Constant Rotational Velocity
6. Visual Inspection in Operation
7. Original Balance for Life—*and*

THOMAS ALL-METAL COUPLINGS HAVE NO WEARING PARTS SO THEY REQUIRE NO LUBRICATION AND NO MAINTENANCE

Write for Catalog 51A

THOMAS FLEXIBLE COUPLING CO.

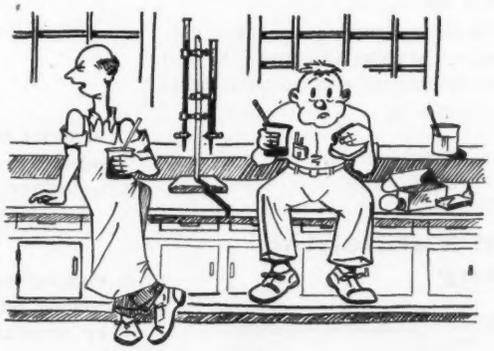
WARREN, PENNSYLVANIA, U.S.A.

When inquiring check 7153 opposite last page

Couplings join pipe securely so flow can be resumed immediately at full pressure

Description: Units with asbestos-mica packing rings can be supplied, on order, in carbon-molybdenum, chromium-molybdenum, or stainless steels. Coupling can also be furnished with a number of packing ring materials including neoprene or Hypalon. Units can be furnished with any style of packing in sizes 2 through 36".

(Weld + Ends Couplings are product of Pipe Line Development Company, Dept. CP, 5700 Detroit Ave., Cleveland 2, Ohio. . . . or for more information reader may simple check 7154 on handy form opposite last page.)



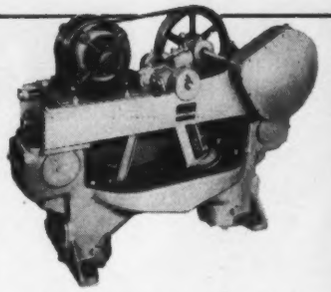
"All right, where's the wise guy who set this beaker of coffee here in place of my potassium permanganate?"

Robert Delezenne, of Peerless Cement Corporation, sent the above cartoon to us.

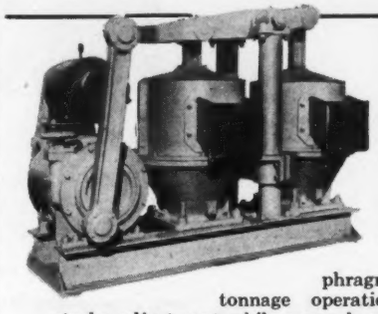
DORR-OLIVER PUMPS

for maximum flow, long life, minimum maintenance

DORRCO Type V Pump



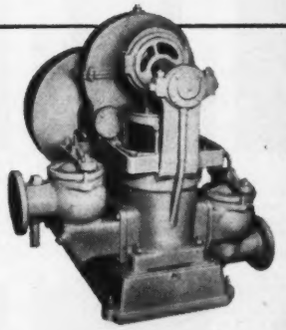
For removing underflows from Thickeners and Hydro-separators by positive displacement. Twin pumping chambers with individual suction and discharge connection for each chamber. Adjustable stroke while pump is running. Six sizes to handle up to 30 cu. ft. of pulp per minute. Write for Bulletin No. 5001.



DORRCO Type W Pump

A rugged duplex diaphragm pump designed for big tonnage operation featuring variable stroke adjustment while pump is running. Available in 6" and 8" models to handle up to 75 cu. ft. of pulp per minute. Write for Bulletin No. 5002.

DORRCO Plunger Pump



A dependable unit for pumping sludges in municipal and industrial water and waste treatment plants. Adjustable eccentric permits stroke variation of 1" to 5". Can be controlled by program time clock for optimum 24-hour operation. Write for Bulletin No. 5182.

Dorr-Oliver engineers, backed by 51 years of pump design and application, will gladly discuss your pumping problems. Write for their assistance.

DORR-OLIVER INCORPORATED

WORLD-WIDE RESEARCH · ENGINEERING · EQUIPMENT

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When inquiring check 7155 opposite last page

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Engineering graduate, Illinois Institute of Technology. 31 years in chemical and processing industries. Engineering, design and sales: Johns-Manville, Blatchford Corporation, Barber-Colman Co., Brown Instrument Co., Creamery Package Co., Askania Regulator Co.

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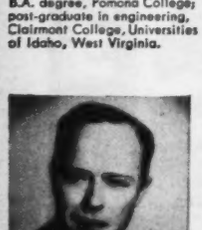
A unique editorial philosophy guides Chemical Processing—

- ... *readability of content* is fully as important as the editorial content itself. *Unless an article is read, it serves no one.*
- ... to build maximum readership, *of the busy men who manage,* editors must first *take the work out of reading.*
- ... articles must be terse, to-the-point, vital, pertinent to the *job-interests* of readers, adequate in information.
- ... headlines must *inform* quickly what each article is about ... no vague or "tricky," misleading heads to waste readers' time.

From more than 30 years publishing experience, Publisher Putman designs the editorial pattern. The staff of technical editors fits the vital editorial content into this pattern.



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Assistant Editor
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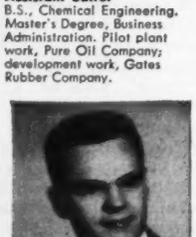

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Staff writer, *The Evansville Courier*, technical petroleum writer; engineering liaison, expediter with International Harvester, Chicago Screw Co.

Putman Publishing Company

111 East Delaware Place, Chicago 11, Illinois

Publishers of
FOOD PROCESSING
CHEMICAL PROCESSING • FOOD BUSINESS
INDUSTRY POWER

"Executive Magazines For Industry"

Misalignment equalized, vibration eliminated by tubing ...

seamless-bronze product contains corrugations to permit expansion and contraction

Uses: Conveying steam, water, or air, or for transmitting vacuum.

Features: Seamless, corrugated, bronze tubing serves to eliminate vibration, equalize misalignment, and allow for expansion and contraction of lines.

Description: Product has 8" ID, metal thickness of 0.080", 12 corrugations per foot, and an approximate weight of 20 lb/ft. Maximum length available without a joint is about 8 ft. End connections of any type are available, such as standard or special flanges, pipe nipples, or weld ends.

If internal pressures are involved, metallic-braid jackets are provided for added strength. Safe working pressure for one braid is about 100 psi. Standard stock sizes of tubing are available down to 1/16" ID.

Seamless corrugated tubing has 8" ID, standard 150-lb bronze flanges

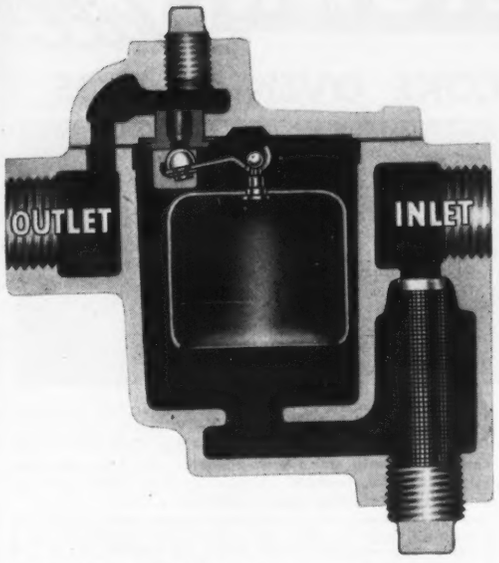
(Corrugated tubing is product of Seamlex Company, Inc., Dept. CP, 4123 24th St., Long Island City 1, N.Y. . . . or for more information check 7156 on form opposite last page.)

Strainer trap and venting trap handle pressures of 250 psi at 450°F ...

units have cast semi-steel construction

Positive removal of all condensate plus a built-in strainer for protection of equipment are provided by manufacturer's strainer trap. Units are of cast semi-steel construction. Seats and discs are made of heat treated stainless steel, resistant to corrosion, wire drawing, or cutting. Traps are designed for pressures up to 250 psi and temperatures to 450°F. They have horizontal inlet and outlet connections.

Venting traps automatically discharge accumulated air or gas at high points of a liquid or closed



Strainer trap offers fast, positive removal of all condensate plus a built-in strainer

system. Traps are furnished in semi-steel for temperatures to 450°F and pressures to 250 psi. Pressures to 300 psi are possible at lower temperatures. Fabricated steel units will handle up to 600 psi at temperatures as high as 750°F and up to 1000 psi at lower temperatures. Traps are furnished with a stainless steel ball float or a non-collapsible, stainless steel open-end float. Valve points are guided to assure positive closing.

(Strainer traps and venting traps are products of The Clark Manufacturing Co., Dept. CP, 1830 E. 38th St., Cleveland 14, Ohio . . . or for more information check 7157 on form opp. last page.)

Gives effective lubrication from −100 to +800°F . . .

graphite is supplied in spray containers for easy application

Uses: Lubrication of metallic and non-metallic surfaces, especially those of odd sizes and shapes or in hard-to-reach locations.

Features: Material, graphite, provides effective lubrication at temperatures ranging from −100 to +800°F. It does not pick up lint, dust, or dirt. Oxidation, corrosion, friction are greatly reduced.

Description: Graphite lubricant is supplied in 6-oz spray containers. After surface is cleaned with a degreasing slovent, material is lightly sprayed to form a long lasting lubricating film.

(Spray Graph is a product of American Resin Corp., Dept. CP, 3215 N. Sheffield Ave., Chicago 13, Ill. Check 7158, opposite last page.)

Canned pumps cut downtime...

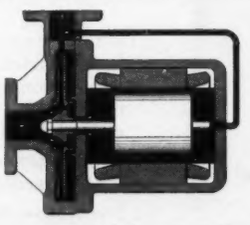
Leakproof Chempump helps avoid shutdowns at Publicker acetic acid plant

These two *Chempumps* are handling a mixture of alcohol, ethyl and propyl acetate and water . . . definite trouble makers for conventional centrifugal pumps. The men at Publicker say these pumps are doing a job that no other can handle.

Conventional centrifugals previously used couldn't hold this volatile, highly solvent mixture. Maintenance men had to tighten glands every few days, repack stuffing boxes twice a month. Leakage was expensive and hazardous . . . and downtime at this 24-hour-a-day plant was a really serious problem.

Installation of these two Series C *Chempumps* was the solution. One pump, on feed service, runs 24 hours a day, seven days a week. The other, a by-product pump, runs four or five days out of every 14. A simple bearing change once a year is the only maintenance required.

Perhaps your operation calls for a seal-less *Chempump*. For details, write to Chempump Corporation, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.



Chempump combines pump and motor in a single hermetic unit. No shaft sealing device required.

U. L. approved. Available in a wide choice of materials and capacity ranges for handling fluids at temperatures to 1000 F. and pressures to 5000 psi.

Chempump

First in the field...process proved

When inquiring check 7159 opposite last page

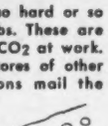
EASY DOES IT ...WITH CO_2

SEE HOW CO_2 CAN WORK FOR YOU

Send For Free Booklet "Applications Unlimited"

No other gas works so hard or so well—at so many jobs. These are typical examples of CO_2 at work. For information on scores of other important applications mail the coupon below.

sponge specialist



CO_2 is extensively used in the manufacture of both foam rubber and foam thermoplastics. Among CO_2's most important applications in these fields are its uses as a foaming agent and as a neutralizer.

hides get help

In pre-tanning processes, CO_2 is the ideal weak acid for lowering and controlling pH of the skins. Why ideal? The close control required by stronger acids isn't necessary. CO_2 is also far easier and safer to handle.

wonder drugs last longer

Heat harms blood plasma, penicillin and other pharmaceuticals. Yet, for these drugs to be stored efficiently, moisture must go. The answer is CO_2 "freeze drying." CO_2 is fully as effective as other systems, yet capital outlay is minute in comparison.

next case... yours

There's practically no end to the important jobs that CO_2—combined with LIQUID CARBONIC savvy—is doing. Chances are that this combination can come up with some surprising answers for you, too.

MAIL COUPON FOR FREE "APPLICATIONS UNLIMITED" BOOKLET

THE LIQUID CARBONIC CORPORATION
3124 South Kedzie Avenue, Chicago 23, Illinois

Send me my free copy of "Applications Unlimited."

Name_____

Company_____

Position_____

Address_____

City_____ Zone___ State____

When inquiring check 7160 opposite last page

Valves protected from dust or foreign particles by metal filter . . .

unit removes matter 5 to 12 microns or larger from fluid stream

Uses: In conjunction with valves handling small flows where foreign particles tend to clog throat, change effective opening, or obstruct full closing.

Features: Replaceable bronze filter element removes dust or foreign matter 5 to 12 microns or larger from fluid stream.

Description: Line filter series has casings constructed of brass or stainless steel. They are available in two female pipe sizes: ⅛ and ¼" NPT.

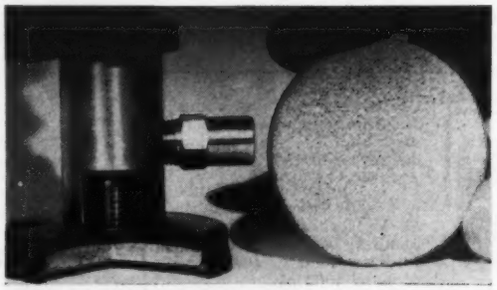
(Micron-Filter is a product of Hoke, Incorporated, Dept. CP, 145 S. Dean St., Englewood, N.J. . . . or for more information check 7161 on form opposite last page.)

Automatic lubrication at 200-500°F made possible by bronze filter and silicone rubber disc . . .

high-temperature units utilize oils that resist carbonizing and subsequent clogging of lines

Uses: Continuous or "one shot" centralized lubrication of high-temperature equipment.

Features: Sintered bronze filter material at inlet of lubricator and on individual meter units, the points where high temperatures present a problem, and a silicone rubber check valve disc on meter units, permit operation at temperatures up to 500°F. Oils that resist carbonizing in distri-



Sintered bronze filter for meter unit has a density equivalent to an SAE F-10 felt filter

KUTZTOWN *Skill*

CREATES COKE OVEN VALVES

For High Quality Castings . . . . in Production-run Quantities - - it pays you to specify KUTZTOWN MACHINE MOLDING!

All cast components of these Coke Oven Valves were machine molded at our plant for the Wilputte Coke Oven Division of the Allied Chemical & Dye Corporation. All cast components are interchangeable . . . held to close tolerances. An example of quality production, uniform production and economical production.

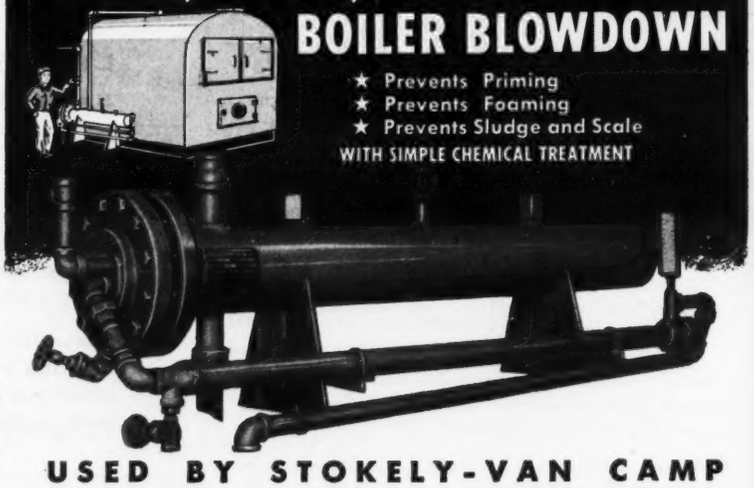
We'll be happy to place your name on our mailing list to receive regular issues of the "Kutztown REVIEW".

• GRAY IRON • PRESSURE IRON • LO-ALLOY IRON • HIGH TENSILE IRON • DUCTILE IRON • NI-RESIST

KUTZTOWN FOUNDRY & MACHINE CORP.
KUTZTOWN, PENNSYLVANIA

When inquiring check 7162 opposite last page

Completely Automatic BOILER BLOWDOWN



★ Prevents Priming
★ Prevents Foaming
★ Prevents Sludge and Scale
WITH SIMPLE CHEMICAL TREATMENT

USED BY STOKELY-VAN CAMP

..at their Beaver Dam, Wisconsin Cannery to insure absolute, automatic control of boiler water concentration. This compact, self-contained unit was easily and quickly installed by their own maintenance men.

Automatic control is assured *without heat loss* regardless of boiler load.

For further information write . . .

Our field engineers will call at your plant on your request.

HENSZEY
HENSZEY COMPANY
Dept. C, Watertown, Wisconsin

When inquiring check 7163 opposite last page

bution system, which clogged tubing and prevented accurate feeding, are utilized.

Description: Lubrication system consists of a combination pump-reservoir, line distribution system with junctions and branch lines leading to each lubricating point, and individual meter units which filter and measure oil and maintain one-direction oil flow. Sintered bronze filters, with a density equivalent to an SAE F-10 felt filter, are held in position in lubricator and meter units by molded silicone rubber O-rings. Check valve discs, for meter units, are silicone rubber smoothly calendered on both sides and 0.010" thick.

Oils that resist carbonizing at high temperatures, one a synthetic base and two with petroleum bases, where developed by several leading lubricant suppliers. Specific recommendations are made with each installation.

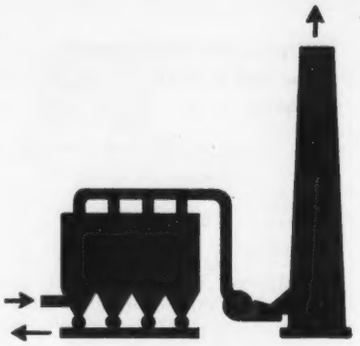
(High-temperature centralized lubricating system is supplied by Bijur Lubricating Corp., Dept. CP, Rochelle Park, N.J. . . . or for more information check 7164 on form opposite last page.)

Some compressed air problems and how to solve them

Problem of water and oil in compressed air lines and how to solve it is subject of 18-page, animated booklet. Handy table lists approximate air needs of air tools and air cylinders.

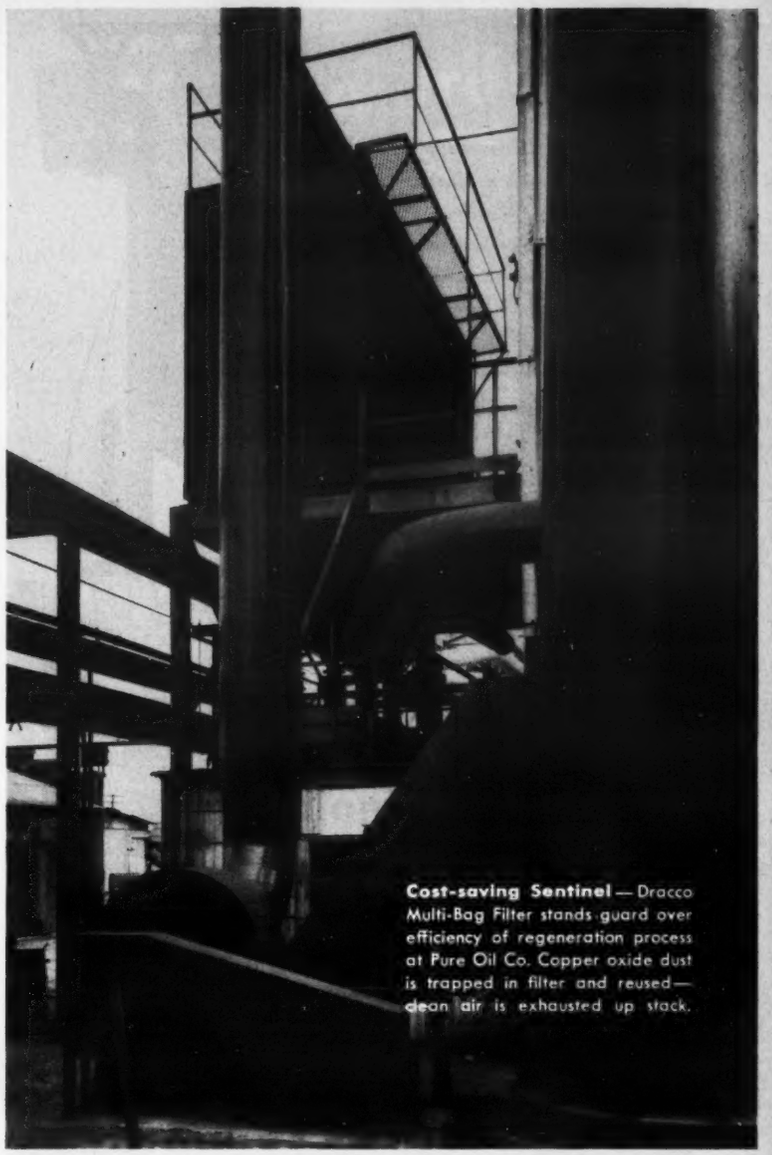
"Air, Water, and Industry" is available from Van Products Co., Dept. CP, 5727 Old Ridge Road, Erie 7, Pa. When inquiring specify 7165 on form opposite last page.

Thanks to J. K. Anderson, of the Research Division of Rayonier Inc., Shelton, Wash.



DRACCO RECOVERY SYSTEM AT REFINERY MEANS:

pure air, sure savings for Pure Oil



Cost-saving Sentinel—Dracco Multi-Bag Filter stands guard over efficiency of regeneration process at Pure Oil Co. Copper oxide dust is trapped in filter and reused—clean air is exhausted up stack.

■ At its Toledo refinery, Pure Oil Co. has halted escaping dust from a copper oxide regeneration process with Dracco Dust Control equipment. This dust problem was a costly nuisance—wasting valuable chemicals and causing undesirable working conditions.

Pure uses a cupric oxide for sulfur removal during refining of naphthas. Regenerating the spent cupric sulfide back to the oxide requires roasting, grinding and handling operations.

Dust is now trapped at multiple sources and recovered at 99½-100% efficiency in a Dracco Multi-Bag Filter. The system operates 24 hours a day, exhausting clean air with no visible dust. Savings are realized by returning collected copper oxide to process.

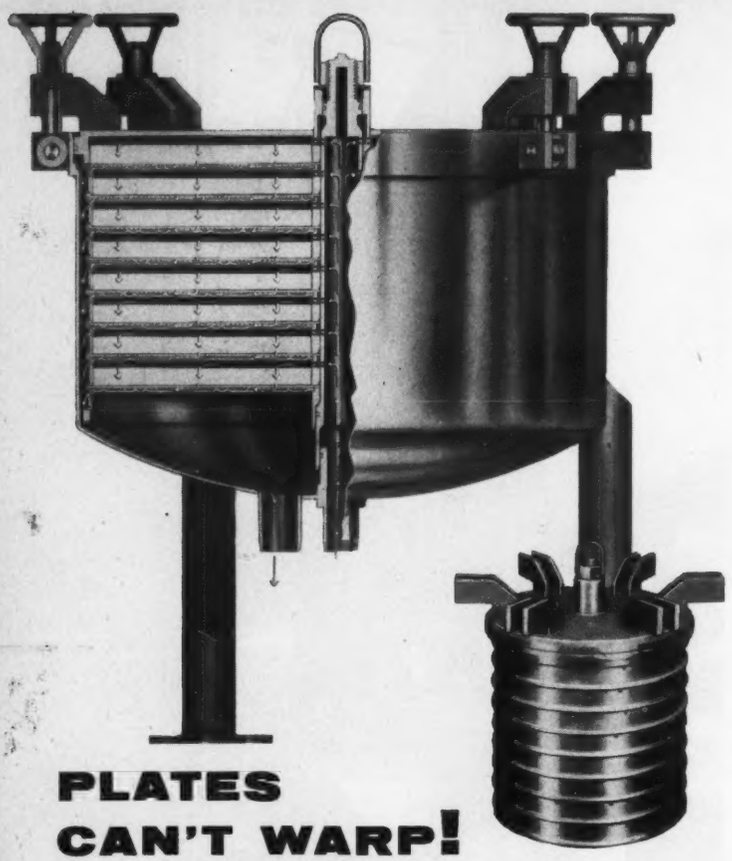
For Pure Oil Co., Dracco Dust Control now means pure air and cost savings. For *your* plant, a custom-engineered Dracco system can provide similar advantages. Why not call or write Dracco today?

DRACCO CORPORATION
4070 East 116th Street • Cleveland 5, Ohio

Bulletin 800 is Dracco's 40-page catalog on dust control and recovery. Contains detailed facts and figures on all dust control equipment. For your copy, write Dracco today.

DRACCO *Performance Proved*
Airstream **CONVEYORS · DUST CONTROL EQUIPMENT**

When inquiring check 7166 opposite last page



PLATES CAN'T WARP!

Simple construction of the "Batch Miser" horizontal plate filter eliminates plate warping . . . and thus prevents leakage. A pressure ring (integral with cover) bears on rim of top plate. As cover is tightened, pressure is exerted on plate assembly *equally* around its perimeter. Remove one pressure nut on the central manifold and leaves can all be disassembled. Without tie rods, downtime is less. Ideal for fine filtering, "Batch Miser" recovers 100% of both liquid and solids, without scavenging.

MAIL COUPON TODAY

Niagara FILTERS

A DIVISION OF

American Machine and Metals, Inc.

Dept. CP-856, EAST MOLINE, ILLINOIS

(Niagara Filters Europe: Amsterdam C, Holland)

☐ Send Bulletin with complete data on the new Niagara "Batch Miser" for handling _____.

☐ Send details on renting a pilot model.

NAME & TITLE

COMPANY

ADDRESS

CITY ZONE STATE

Specialists in Liquid-Solids Separation

When inquiring check 7167 opposite last page

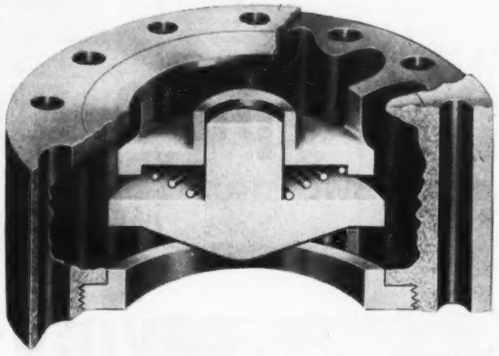
Water hammer control for hot or cold liquids . . .

check valve handles salt water, oils, acids, chemicals, or brine

Uses: Water hammer control where flow is constant.

Features: Flanged check valve can be used for water hammer control for all types of hot or cold liquid service. It will handle water, oils, gasoline, acids, chemicals, salt water, or brine.

Description: Valve is available in sizes from 1 to 10", faced and drilled in accordance with ASA standards for pressures ranging from 125 to 2500 psi. Units can be furnished with special flange facings, including large male and female, ring joint, and large tongue and groove. Disc and seat are removable and renewable. Valve can be used in any position.



Check valve for control of water hammer can be used in any position

(Figure 454 check valve is a product of The Williams Gauge Co., Inc., Dept. CP, 2 Gateway Center, Pittsburgh 22, Pa. . . . or for more information check 7168 on form opposite last page.)

Clear water seal protects shaft, stuffing box of centrifugal pump from abrasive materials . . .

small stream flows through clearance spaces between impeller and stationary parts

Uses: Transporting mixtures of abrasive materials such as ash, slag, coke, or similar substances.

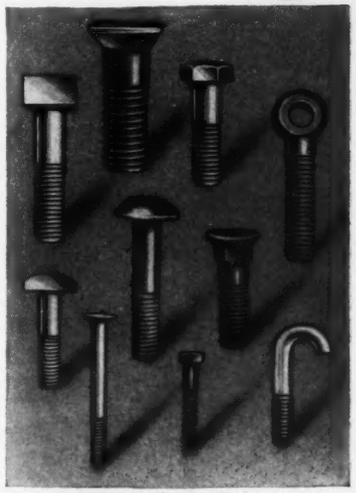
Features: A small stream of clear water flowing continuously through clearance spaces between rotating impeller and stationary parts into the shell and suction eye of impeller acts as pump's seal. This seal effectively protects shaft, stuffing box, and suction seal from abrasive-laden water and

Threaded Specialties

lower cost TEE BOLTS by an exclusive method

Among Pawtucket's many specialty products are these lower-cost tee-head bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.
Pawtucket tee head bolts are made in standard sizes ¼" and larger, or to your specifications. In any size, you can depend on a uniform Class 3 fit, if required.

All standard steels, stainless steels and non-ferrous metals, including Titanium



BETTER BOLTS SINCE 1882

PAWTUCKET MANUFACTURING COMPANY

327 Pine St. • Pawtucket, R. I.

THE PLACE TO SOLVE YOUR BOLT PROBLEMS

T.M. REG.

"The Bolt Man"

When inquiring check 7169 opposite last page

Catawissa PERFECT SEAL Unions

HOT FORGED from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

A TYPE FOR EVERY USE!
FOR ALL PRESSURES!
FOR ALL TEMPERATURES!

Standard & Double Extra Heavy UNIONS

Available with screwed or socket weld ends. 3000-lb. sizes ⅛" to 3"; 6000-lb. sizes ⅛" to 2".

ORIFICE UNIONS

With screwed or socket weld ends. 3000-lb. and 6000-lb. service.

MALE & FEMALE UNIONS

With steel-to-steel, bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.

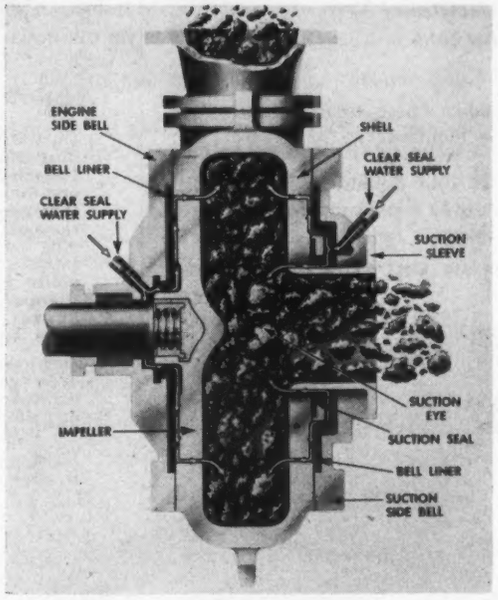
FULL STAINLESS & FULL ALLOY STEEL UNIONS

With screwed or socket weld ends. 3000-lb. and 8000-lb. service.

WRITE FOR CATALOG 56
showing the complete Catawissa line of Perfect Seal Products

CATAWISSA VALVE AND FITTINGS COMPANY
620 Mill St. • CATAWISSA, PA.

When inquiring check 7170 opposite last page



Passage of clear seal water between impeller and stationary part of pump

eliminates frictional wear and enlargement of running clearances between moving parts.

Description: Units are available with rubber, neoprene, or other synthetic lining for pumping fine solid materials, especially where resistance to chemical action is important. Hard metal alloy wearing parts, for handling sharp-edged solids that would tend to cut softer, non-metallic linings, can be supplied. Individual units can be adapted to a wide range of capacities and heads by a simple change of V-belt drive ratio.

(A-S-H Hydroseal pumps are products of The Allen-Sherman-Hoff Co., Dept. CP, 259 E. Lancaster Ave., Wynnewood, Pa. . . . or for more information check 7171 on form opposite last page.)

Schematic piping layout presented in expansion joint catalog

Discussion of expansion joints, types of pipeline motion solved by their use, and a schematic piping layout illustrating expansion joint applications and principles are among many topics covered in 26-page engineering catalog. Design considerations discussed include anchoring, axial, lateral, and angular motion, vibration; and strength analysis of corrugated element. Complete specifications are included.

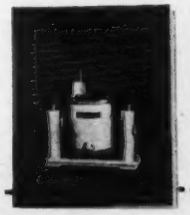
Cat 153 is issued by Flexonics Corp., Dept. CP, 1319 S. Third Ave., Maywood, Ill. . . . or for more information reader may simply check 7172 on form opposite last page.

NEW centrifugal

has pushbutton unloading . . . and handles out-of-balance loads!

Now Tolhurst has combined bottom discharge with Center-Slung® suspension. Complete unloading is controlled by a single knob. So the new Batch-Master Centrifugal saves unloading time *and* runs smoothly, safely — with vibration largely eliminated.

FREE BULLETIN illustrates how Center-Slung Centrifugals handle 3 to 4 times greater out-of-balance loads than ordinary machines. Send for your copy now.



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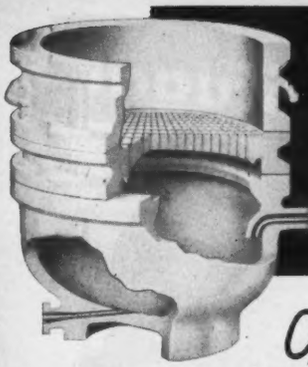
Tolhurst CENTRIFUGALS
A DIVISION OF
American Machine and Metals, Inc.
Specialists in liquid-solids separation
DEPT. CPT-856, EAST MOLINE, ILLINOIS

☐ Send free Bulletin TC-14-55 on new Batch-Master.
☐ Have a representative call.

NAME AND TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

When inquiring check 7173 opposite last page



CHEMICAL PORCELAIN

VACUUM FILTERS

Offer:

- **Versatility:** ideal for batch production or where quick-changeovers are desirable.
- **Simplicity:** most economical to maintain and operate.
- **Corrosion-Resistance:** inert to all chemicals and solvents except hydrofluoric acid and hot caustics.
- **Non-absorbent:** body is dense, impermeable.
- **Non-contaminating:** no metallic impurities, the porcelain body is completely iron-free.
- **Easy-Cleaning:** cleans as easily as a china dish.

All "U.S." vacuum filters will withstand a complete vacuum. They are made in several styles and in a size range from one gallon to 150 gallons.

Write for Bulletin F-40 259E

CHEMICAL CERAMICS DIVISION

U. S. STONEWARE

AKRON 9, OHIO

When inquiring check 7174 opposite last page

NEW LIGHTWEIGHT

HYDRAULIC BENDER

BY GREENLEE

full 90° bend with one stroke of the ram . . . easy portability . . . extra versatility

Here's the kind of real portability you've been looking for in a bender for ½" to 2" pipe and conduit. Using light, but strong, aluminum alloy for many parts the new GREENLEE No. 880 Hydraulic Bender is unusually *lightweight*, yet extra rugged, fast, *powerful!* One man can easily carry and operate it to quickly make *uniform* bends. Complete 90° bends can be made with one ram stroke! Separate two-speed hydraulic hand pump and ram simplify handling and setup. Easily operated by hand or can be used with a power pump. Attachments also available for bending thin-wall conduit, tubing, bus-bars. Get complete details, write for Bulletin E-217.

GREENLEE

GREENLEE TOOL CO., 2388 HERBERT AVE., ROCKFORD, ILL.

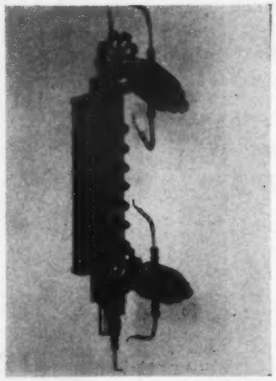
When inquiring check 7175 opposite last page

Heat provided electrically for gages used for cold liquid service . . .

units are valuable where accurate control of temperature is required

Uses: Gaging of cold liquids, such as waxes, which require heating to allow proper flow, where no steam is available.

Features: Units are electrically heated. Close control of gage glass temperature is possible. Electrical system is valuable where there is need for very close control of temperatures in gage glass.



Electrically heated units can be furnished in any material required to meet corrosive conditions

Description: Gages are available in double-chamber reflex or external tube transparent gage models in various sizes and pressure groups. Jacketed cocks have connections screwed, for socket welds, or flanged, and may be furnished with or without ball checks. All units may be furnished in any material required to meet corrosive conditions. Electrically heated gages can be adapted to requirements of Underwriters' Laboratory for explosion-proof construction.

Heating element is a Chromalox unit for 120 or 240v AC with wattage output to meet requirements. A heat-resistant silicone paint is used for protection of external finish.

(Electrically heated gage and valves are products of Jerguson Gage & Valve Co., Dept. CP, 80 Fellsway, Somerville 45, Mass. Check 7176 on form opposite last page.)

you are reading **chemical processing** For Men who Manage

. . . because your are responsible for some phase of processing in your company. The Editors explain how you and other "men who manage" these operations are selected to receive the magazine regularly.

. . . see page 122.

LENAPE

STUDDING OUTLETS *offer many advantages*

Curved Studding Outlets or Pads in ASA sizes and standards provide reinforcement of the shell opening. Studding outlets, naturally short in height and providing reinforcement of the opening, have design appeal, economy in price and fabrication, and advantages in use.

Important applications include interdeck access openings on small diameter towers or columns, boiler mountings, clean-out or observation ports, and similar uses in close-clearance locations.

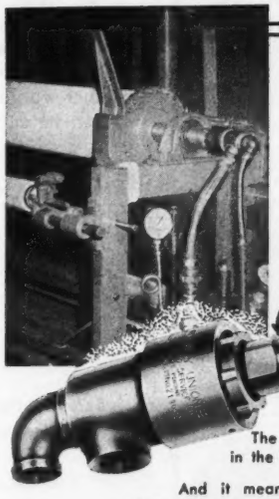
Sizes 16" and larger (even to 30" I.D.) are ideal access openings and in 18" and 20" sizes are the most modern and economical manway for LPG tanks.

Complete standards on pages 36-39 of Lenape Catalog 10-53.

LENAPE HYDRAULIC PRESSING AND FORGING CO.

LENAPE HYDRAULIC PRESSING & FORGING CO.
DEPT. 100 WEST CHESTER, PA.
RED MAN PRODUCTS

When inquiring check 7177 opposite last page



The **ROTARY UNION**

Reg. U. S. Pat. Off.

Wherever Rotating Connections are Required

The ROTARY UNION is patented in the USA and Foreign Countries.

And it means the finest, longest lasting rotating joint in the world . . . the high speed, high pressure, positive mechanical seal which is self-aligning and self-adjusting. The ROTARY UNION will save you money on rubber and plastic equipment, flake rolls, grain dryers, ball mills, calenders, printing and coating machinery, and on any other revolving equipment which must be heated or cooled . . . so be sure to specify the ROTARY UNION.

Write for Bulletin 700C

Permits Field Repair

Baltimore, Camden, N. J., Cleveland, New York, Chicago, Los Angeles, Providence, Montreal, Toronto

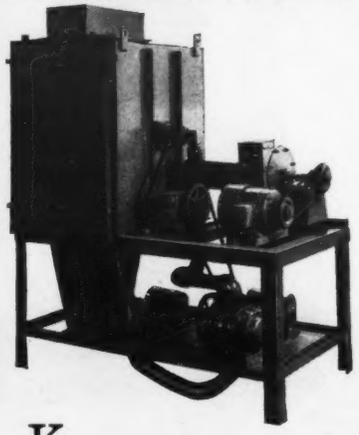
"Where *Good Connections* Count"®

PERFECTING SERVICE CO.
(Home Office and Factory)
312 Atando Ave. Charlotte, N. C.

When inquiring check 7178 opposite last page

NOW... CONTINUOUS HIGH EFFICIENCY with KOPPERS Model D Aeroturn Dust Collector!

Factory-Assembled... Automatic...Fits Anywhere!



KOPPERS Model D Aeroturn Dust Collector is a compact unit with king-sized features: patented reverse-air-jet action,* uninterrupted peak efficiency, and automatic self-cleaning.

Put it in a corner . . . on a shelf . . . up on ceiling rafters. Koppers Model D Aeroturn occupies as little as 25 sq. ft. of space. Capacities range from 500 to 4800 CFM.

Write today for complete information to: KOPPERS COMPANY, INC., *Industrial Gas Cleaning Dept.*, 5308 Scott St., Baltimore 3, Md.

*Hersey Patents

KOPPERS AEROTURN DUST COLLECTOR

Engineered Products Sold With *Service*

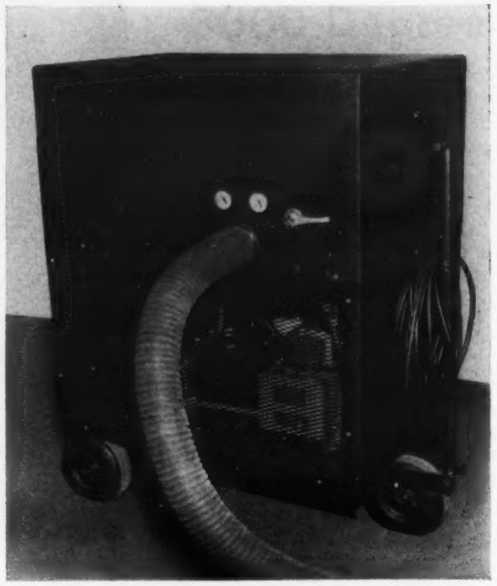
When inquiring check 7179 opposite last page

Tanks cooled for maintenance work by mobile air cooling unit . . .

delivers 500 to 1000 cfm to confined areas

Uses: To provide cool, fresh air for maintenance workers in confined areas such as large tanks or vats.

Features: Cooling unit is mounted on a four-wheeled steel cart for complete mobility. It will deliver 500 to 1000 cfm.



Mobile cooling unit provides cool, dry air for maintenance crews working in confined areas

Description: Refrigeration capacities up to 60,000 Btu/hr are available, giving a temperature reduction of from 30 to 40°F.

(Breeze Wagon is a product of Peuchen Engineering Corp., Dept. CP, PO Box 1969, Wilmington 99, Del. . . . or for more information check 7180 on form opposite last page.)

Valve for difficult applications detailed in catalog

How manufacturer's valves resist erosion, handle high-pressure differentials, provide tight shut-off, and satisfy other difficult application requirements are detailed in 20-page catalog. Performance and engineering data for high-pressure, high-temperature, and corrosion-resistant control valves are included.

Cat on control valves is issued by P-K Industries, Inc., Dept. CP, 27 Porete Ave., North Arlington, N. J. Specify 7181 opposite last page.

In poker or in heat transfer equipment, this hand is as good as money in the bank.

Manning & Lewis heat transfer and process equipment is designed and constructed to better *your* most exacting requirements and make it easy for you to place a safe bet on trouble-free worry-free, long term operation.

M & L meets all requirements of A.S.M.E. or any other agency specified by you, the customer. All equipment designed by M & L is sold on a guaranteed basis for your protection.

Try us on your next quotation —or send now for your copy of bulletins pertaining to your particular need.

COOLERS HEATERS REACTORS
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PRESSURE VESSELS

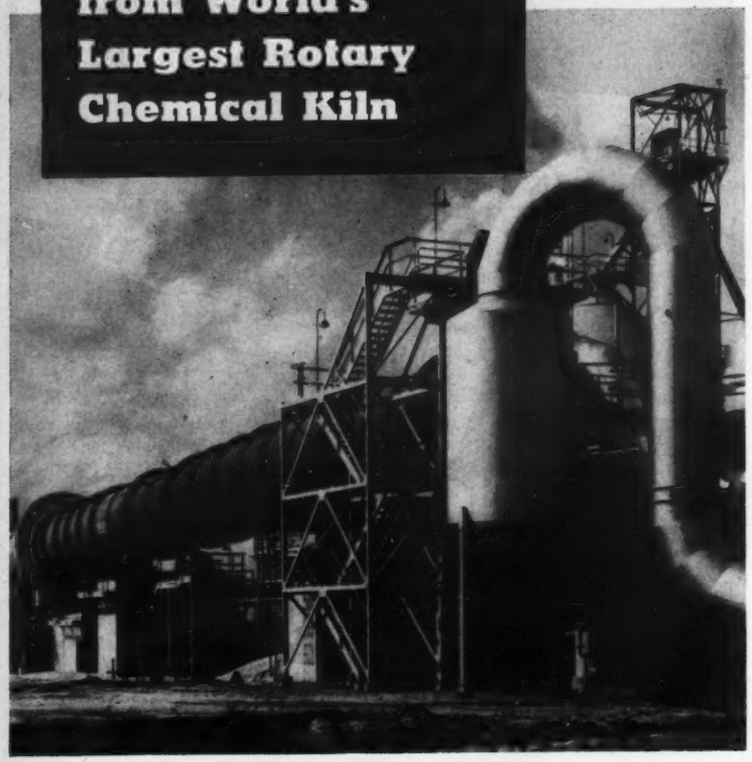
Manning & Lewis Engineering Co.

30 Ogden Street Newark 4, New Jersey

SALES REPRESENTATIVES IN PRINCIPAL CITIES

When inquiring check 7182 opposite last page

Peabody Scrubber Cleans Exhaust from World's Largest Rotary Chemical Kiln



In the new lithium hydroxide plant of American Lithium Chemicals, Incorporated, San Antonio, Texas, Peabody Scrubbers play a vital role by recovering valuable lithium ores from rotary kiln exhaust gases. This, the world's largest rotary chemical kiln, is served by two 11-foot Peabody units.

As in other Peabody Scrubber installations, effectiveness of recovery of fine ore particles is assured by the exclusive Peabody impingement plate design. Because of this special feature, gas and scrubbing liquid are brought into intimate contact and efficiencies of 99.8% are not uncommon in product recovery applications of this type.

Consult Peabody on any problem involving towers for scrubbing, cooling and absorbing.

PEABODY ENGINEERING CORPORATION
232 MADISON AVENUE, NEW YORK 16, N. Y.
OFFICES IN PRINCIPAL CITIES
PEABODY LIMITED • LONDON, S.W. 1, ENGLAND 6-137

When inquiring check 7183 opposite last page

Cartridge-type filters in service at Dow Chemical's Midland plant

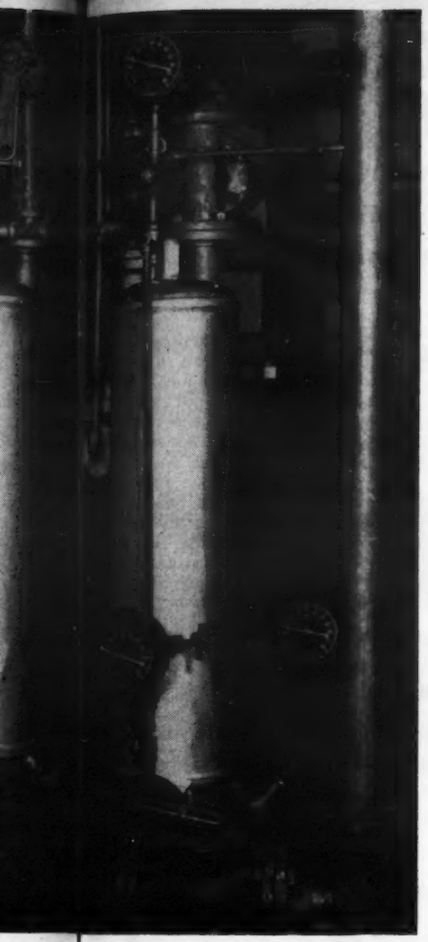
Dow Chemical's styron molding powders are kept spic and span as —

cartridge filters efficiently trap small impurities

Multiple units handle many tons of styrene monomer feed which enter the process in around-the-clock operation

Problem: At The Dow Chemical Company's Styron Plants a great many various types of filters have been used to protect product from undissolved foreign material entering the reaction vessels with the styrene monomer. Sediment and scale which might enter the monomer during shipment and handling are thus avoided. All filters have some advantages and disadvantages including the possibilities of incorrect assembly or broken papers which would render the filter in use ineffective. Depending on the level of operation and the degree of contaminant being removed, some filters require changing as often as once a day to maintain filtering efficiency.

Solution: Four years ago one satisfactory solution was arrived at in the Midland division. Dow installed multiple units of Model 6AXB3 Micro-Klean filters containing type C-1 cartridges, each made of



FRANK E. McELROY, Assistant Editor
With **BRONSON HARRIS,** Superintendent, Styron Production
The Dow Chemical Company, Midland, Michigan

cotton wound on a glass fiber core.

One such cartridge unit can handle on the order of 20,000 pounds of monomer per hour. The pressure drop through the filter is roughly 15 psig. As impurities build up on the cartridges, the pressure drop rises. Filters are changed when the pressure drop approximates 25 psig.

Results: These filters have proven their efficiency to remove all foreign particles quite satisfactorily. Cartridges do not channel or plug easily. Their service life is satisfactory, requiring changing only once every one or two months. Except for renewing spent cartridges, these filter units have proven to be essentially maintenance free. These units are frequently used in combination with other filter methods to provide assurance of feed quality.

(Micro-Klean filters are products of Cuno Engineering Corp., Dept. CP, 80 S. Vine St., Meriden, Conn. Check 7184 opposite last page.)

What it takes to make a 3000 Degree Refractory Concrete

Because of the widespread interest in the use of refractory castables, many furnace operators have asked us for the story behind the performance of B&W's unique refractory concrete, Kaocast.

Here are the answers to some of the most frequently asked questions:

Q. *When you refer to Kaocast as a 3000 degree refractory castable, do you mean that its melting point is 3000° F?*

A. No, this means that its service use limit is 3000° F; its melting point is 200 degrees higher.

Q. *Just what does it take to make a 3000 degree refractory castable like B&W Kaocast?*

A. Let's first define a few terms. Refractory castables are made with granular materials which are volume stable at high temperatures and which can undergo repeated heating and cooling cycles without disintegration. These materials, known as refractory calcines or grogs, are blended with suitable hydraulic binders. The initial strength of a refractory castable is thus developed in the same manner as that of ordinary concrete—that is, through the chemical action between water and the binder. A strong *ceramic bond* is formed when the refractory castable is subjected to temperatures above the vitrification point.

Q. *Then you have a grog, a binder and a method of putting them together. Which is most important?*

A. You can't say that any *one* is most important. It's a combination of all three. Let's take them one at a time. Our grog consists primarily of the proper blend of kaolin and other alumina-silica materials. This ratio enables us to achieve a grog with minimum expansion and shrinkage, a high fusion point, and greater stability under load, at varying temperatures.

Q. *And now, what about the binder?*

A. There are a number of factors responsible for the success of the Kaocast binder. One is the compound Tricalcium Penta-aluminate (3 lime to 5 alumina). This formula produces the most refractory compound (highest melting point) that can be made from lime and alumina. Another is that by using the purest commercially available lime and alumina, the Kaocast binder is substantially free of iron and silica. Such traces of these that are present combine during the prefiring of the binder to produce stable compounds.

Q. *Just how important is the manufacturing or "blending" of the grog and the binder?*

A. If one factor could be singled out as "most important" it would be quality control.

Direct control over the fineness of materials, prefiring temperatures, and other phases of manufacture is possible at B&W because both the grog and the binder are made and blended at B&W's Augusta Works—under B&W's direct control and supervision.

Q. *These factors you've discussed must add up to some specific advantages of Kaocast. What are they?*

A. B&W Kaocast has all the advantages of easy installation which are responsible for the widespread interest in refractory concretes, plus these exclusive features: It is the only 3000 degree refractory concrete with high resistance to spalling and low volume change throughout its operating range.

THE BABCOCK & WILCOX CO.
Refractories Division
General Offices:
161 East 42nd St., New York 17, N. Y.
Works: Augusta, Ga.

When inquiring check 7185 opposite last page

Specify KNOX TOWER PACKINGS

PORCELAIN

Save Time and Money on KNOX Tower Packings

SINGLE-PARTITION RING

- Uniform Quality
- Zero Porosity
- Iron Free
- High Strength
- Resists High Temperature, Fumes, Vapors, Corrosion, Alkalies and Acids
- KNOX produces porcelain Tower Packings from same composition as is used for High Voltage Electrical Porcelain

Your Inquiry Will Receive Prompt Attention

KNOX PORCELAIN CORP.
KNOXVILLE I, TENNESSEE

When inquiring check 7186 opposite last page

sure cure FOR destructive water hammer

JOSAM SHOCK ABSORBERS

The pounding, shaking noise you hear in your pipe lines is "Water Hammer" — as destructive as it is noisy — loosening fittings, damaging valves and appliances, and causing expensive repairs!
JOSAM SHOCK ABSORBERS easily, inexpensively and permanently "cure" hammering and vibration in pipe lines. Send coupon today for latest scientific data.

JOSAM MANUFACTURING CO.
Dept. CP • Michigan City, Indiana

Please send free copy of Manual "S" on WATER HAMMER

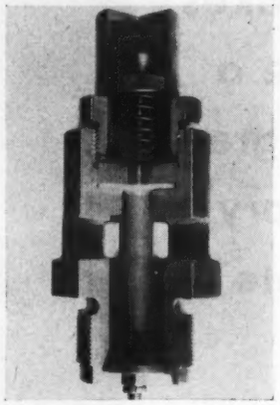
Firm .....
By ..... Title .....
Address .....
City ..... Zone ..... State .....

When inquiring check 7187 opposite last page

Scale prevented in spray valve by sealing moving parts in liquid-tight chamber . . .

elastic sleeve designed to withstand 450°F

Uses: Unit is designed for applications such as feedwater heaters, deaerators, hot process water, water softeners, cooling towers, aerators, degasifiers, and spray ponds.



Valve stem, stem guide, and spring are sealed from contact with liquid

Features: Elastic sleeve seals valve stem, stem guide, and valve spring in liquid-tight chamber. Scale deposits on valve stem are eliminated.

Description: Spray valve has elastic seal designed to withstand temperatures up to 450°F. Valve construction is of bronze or stainless steel. Approximate pressure drop, for 1 and 1½" sizes, is 4 to 5 psig at maximum flow.

(D-J Spray valve is a product of Griggs Machine Co., Inc., Dept. CP, 47 Hathaway St., Wallington, N.J. Check 7188 opposite last page.)

Shows materials of Fiberglas for industry

What products can do and where they are used are topics covered in 12-page, illustrated brochure. Products covered include block and pipe insulations, reinforced tape, waterproof papers, insulated electrical apparatus, filters, built-up roofing, and reinforced plastic panels.

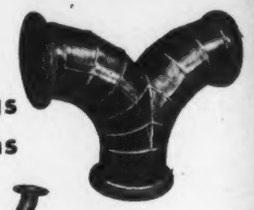
"Materials for Industry" may be obtained from Owens-Corning Fiberglas Corp., Dept. CP, Toledo 1, Ohio. Specify 7189 opposite last page.

Clarification of industrial wastes covered in bulletin

Operation, advantages, specifications, and special features of flotation clarifier for industrial wastes are detailed in 12-page bulletin. Factors to be considered in selecting proper unit are discussed. Bul 6051 is issued by Infilco Inc., Dept. CP, Tucson, Ariz. Specify 7190 opposite last page.

Need PIPE FABRICATIONS?

Let NAYLOR Help You Save on Special Fittings and Fabrications



Naylor fabrication service can help you save money and insure better performance from your piping layouts. By combining several fittings into one integral unit, numerous flanged joints can be eliminated. Naylor pipe sizes range in diameter from 4" to 30" with all types of fittings and connections. Both pipe and fittings are available in steel, alloys and stainless steel.

Send specifications for quotation.

NAYLOR PIPE COMPANY

1260 East 92nd St., Chicago 19, Illinois

Eastern U.S. and Foreign Sales Office: 350 Madison Ave., New York 17, N.Y.

When inquiring check 7191 opposite last page

FREE TEST SAMPLE CAN shows how C-5 solves "HIGH-TEMP" THREAD PROBLEMS!

Prove it to your own satisfaction that C-5 ENDS STUD SEIZING AND GALLING EVEN AT 1800° F

Leading petroleum processors are now using C-5 for flange bolts, studs, and all other threaded surfaces on reactors, cat crackers, autoclaves, heating exchangers, catalytic reformers, pumps and valves, etc., and other applications where temperatures are up to 1800° F.
Fel-Pro's exclusive C-5 colloidal copper formula "copper-plates" metal . . . gives maximum cushioning and protection to 1800° F. without breakdown.
C-5 prevents galvanic action—eliminates pitting even where dissimilar metals are joined . . . protects all threaded surfaces, insuring their repeated re-use!

Write today for your FREE Test Sample CAN. Felt Products Mfg. Co., 1515 Carroll Ave., Chicago 7, Ill.

fel-pro C-5 "HIGH-TEMP"

√ Prevents Stud Breakage
√ Ends Stainless "Pitting"
√ Reduces Torque
√ Speeds Disassembly

1227

ANTI-SEIZE THREAD COMPOUND

When inquiring check 7192 opposite last page

Drive out

FOUL AIR

Blow in

FRESH AIR

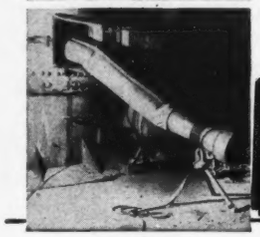
with Coppus Type A Ventilator

Assure greater safety, comfort for workers . . . get greater efficiency.

Drive out dangerous fumes, gases, stagnant or hot air from boilers, cable manholes, tanks, vats and other confined places. *Supply fresh air continuously.*

Send now for further information. Coppus Engineering Corporation, 388 Park Avenue, Worcester 2, Mass.

MANHOLES made safe for workers' entrance within minutes.

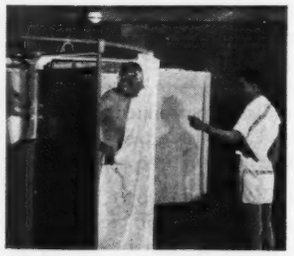


BOILER AND TANK INTERIORS cooled by Coppus. Fresh air supplied continuously.

ANOTHER COPPUS "BLUE RIBBON" PRODUCT

When inquiring check 7193 opposite last page

Group Showers Save Bathing Time

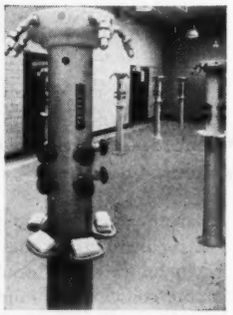


Because they save space and time, Bradley Group Showers have become industry's choice. *One* Shower Unit provides for 5- or 3-stalls with or without partitions and curtains.

One set of piping connections (hot and cold water, and drain) instead of five or three sets. This and the fact that Bradleys come partially assembled cut installation time and costs.

Above shows 3-stall Showers installed along wall and provided with stall partitions and curtains. At right is installation of Column Showers in chemical plant, each serving five bathers simultaneously, each with complete control of water temperature and flow.

For complete specification data, see pages 24 to 26 of new Catalog 5601. Copy mailed on request.



BRADLEY WASHFOUNTAIN CO.
2231 W. Michigan Street,
Milwaukee 1, Wisconsin

Write for copy of newCatalog 5601.

BRADLEY multi-stall showers

Distributed Through Plumbing Wholesalers

When inquiring check 7194 opposite last page

Purifies exhaust steam so that it can be reused . . .

purifier's design produces steam that is clean and dry

Uses: Treating exhaust steam so that it can be reused for heat exchangers, unit heaters, or for heating or condensate.

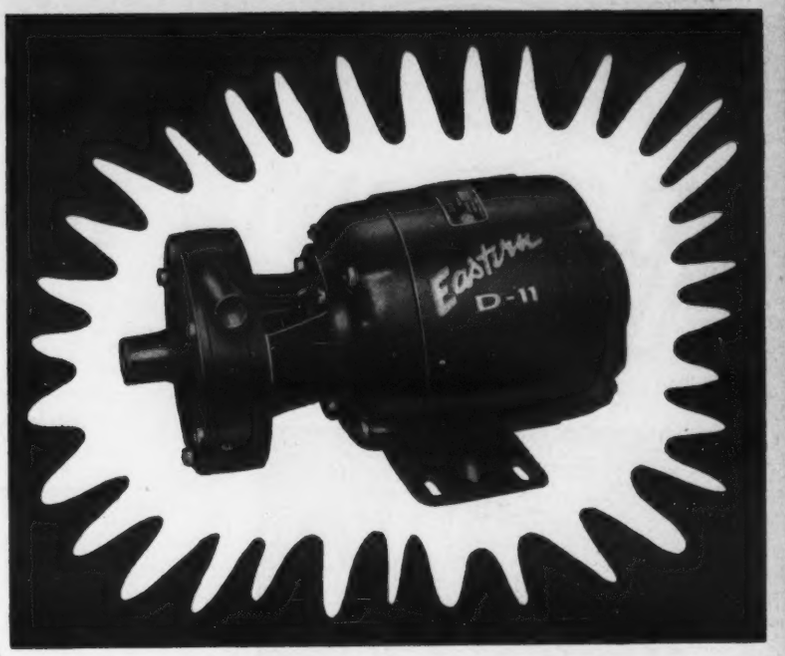
Features: Heater is designed for installation in exhaust steam lines from steam hammers, reciprocating engines, and other steam equipment where it produces clean, dry steam that can be reused in other equipment.

Description: All condensate, oil droplets, and other mist entrainment is separated by means of two-stage method. Method incorporates carefully designed drum and multi-stage separating element. Units are available for pipeline sizes from 4 to 16", for pressures up to 300 psig, with various inlet and outlet arrangements.

(Hi-eF purifier for exhaust steam is a product of Steam Specialties Div., The V. D. Anderson Co., Dept. CP, 1935 W. 96th St., Cleveland 2, Ohio . . . or for more information check 7195 on form opposite last page.)

"I think we should add a pinch of salt now . . . say about three tons."

Idea for this came from G. T. Quinlan, Lever Bros. Co., Cambridge, Mass.



24,830 successful installations!

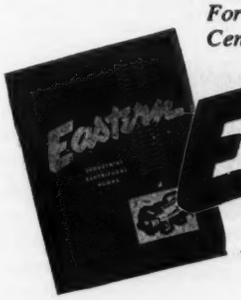
EASTERN D-11 CENTRIFUGAL PUMP

Why is the D-11 so successful among original equipment manufacturers? *Size and weight* make it ideal. The D-11 is the smallest, close-coupled, single-stage centrifugal pump available with an induction type motor. Eighteen pounds of compact design (9¾" x 4⅝") make it excel in industrial and process equipment, as well as laboratory service, and pilot plant operations.

SPECIAL METALS

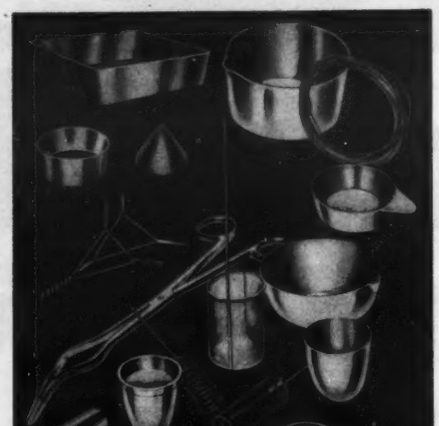
A full selection of metals make the D-11 and other Eastern Centrifugal Pumps versatile performers. Available in 18-8 Type 303 and Type 316 Stainless Steel, Monel, Hastelloy "C", Cast Iron and Bronze, Eastern Pumps range from ⅛th to ¾ H.P. with capacities up to 70 G.P.M., pressures to 65 P.S.I.

For complete specifications on all Eastern Centrifugal Pumps, request Bulletin 120-F



Eastern INDUSTRIES, INC.
100 Skiff St., Hamden 14, Conn.

When inquiring check 7196 opposite last page



- Laboratory wares of all description.
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PALLADIUM, IRIDIUM, OSMIUM, RHODIUM, RUTHENIUM, SILVER AND GOLD

We pay highest prices for scrap platinum and also have facilities for prompt recovery of spent platinum and palladium catalysts

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THE AMERICAN PLATINUM WORKS
231 NEW JERSEY R. R. AVE., NEWARK 5, N. J.
PRECIOUS METALS SINCE 1875
ENGELHARD INDUSTRIES

When inquiring check 7197 opposite last page

new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheets, etc, are found throughout other sections of the magazine

Cationic agents for control of microbiological corrosion

Twelve-page publication tells how cationic surface active agents are used to control microbiological corrosion in petroleum operations. Publication gives technical details of how these chemicals prevent corrosion.

"Control of Microbiological Corrosion" is issued by Aquaness Dept., Atlas Powder Co., Dept. CP, 2005 Quitman St., Houston 26, Tex. When inquiring specify 7198 on form which is located opposite last page.

How to cut costs and save time with plant photography

How industry is cutting costs, saving time, and increasing sales with photography is described in illustrated 16-page booklet. Case histories are included covering successful applications of photography to solve sales, manufacturing, engineering, and design problems.

"Industry Cuts Costs with In-Plant Photography" is issued by Graflex, Inc., Dept. CP, 154 Clarissa St., Rochester 8, N.Y. When inquiring specify 7199 on form opposite last page.

Bulletin discusses study conducted on moisture contents of gases

Experimental measurements conducted on moisture contents of various natural gas mixtures at 220°F and in the 1000-10,000 psi pressure range are described in 22-page research bulletin. Newly-developed correlation for determining the equilibrium moisture content of any natural gas is also presented.

To obtain Research Bulletin No. 8, "Equilibrium Moisture Content of Natural Gases" remit $3.00 direct to Institute of Gas Technology, Technology Center, Dept. CP, 17 W. 34th St., Chicago 16, Illinois.

About motors for dangerous or damaging atmospheres

Motors specially designed for dangerous or damaging atmospheres, designed particularly for chemical plant duty, are described in multi-color illustrated four-page bulletin. Large cutaway drawing illustrates the features of the totally-enclosed units which give them resistance to conditions of corrosion and to moist atmospheres. Units are also suitable for dusty locations.

Form F-1810 is issued by U. S. Electrical Motors Inc., Dept. CP, P.O. Box 2058, Los Angeles 54, Calif. When inquiring specify 7200 on form opposite last page.

Comprehensive compilation given of perforated sheet materials

Standard patterns at actual size are illustrated in 128-page general catalog devoted to perforated materials. Information on hole size, centers, and percent of open area are listed for each pattern. Fabrication facilities, ordering, materials that can be perforated, and list of perforated sheets carried in stock are listed. Handy side tab indexing makes finding particular item of interest easy.

Cat 62 is available from The Harrington & King Perforating Co., Dept. CP, 5636 Fillmore St., Chicago 44, Ill. When inquiring specify 7201 on form opposite last page.

Promotes off-the-job safety in comic book style

Sixteen-page, four-color booklet presents traffic safety methods in question and answer form with colorful cartoons. Booklet aims to make readers more conscious of importance of paying attention to their safety on the streets.

To obtain single copy, remit 18c to National Safety Council, Dept. CP, 425 N. Michigan Ave., Chicago 11, Ill. Quantity prices are available.

Aids in selection of steam traps for processing equipment

Three-page, fold-out piping diagram for 22 pieces of typical processing equipment shows recommended steam trap and piping arrangements in 12-page bulletin designed to aid in selection and application of steam traps. Remainder of booklet is devoted to individual pieces of equipment with related steam trap recommendations. Photographs are used to illustrate typical installations.

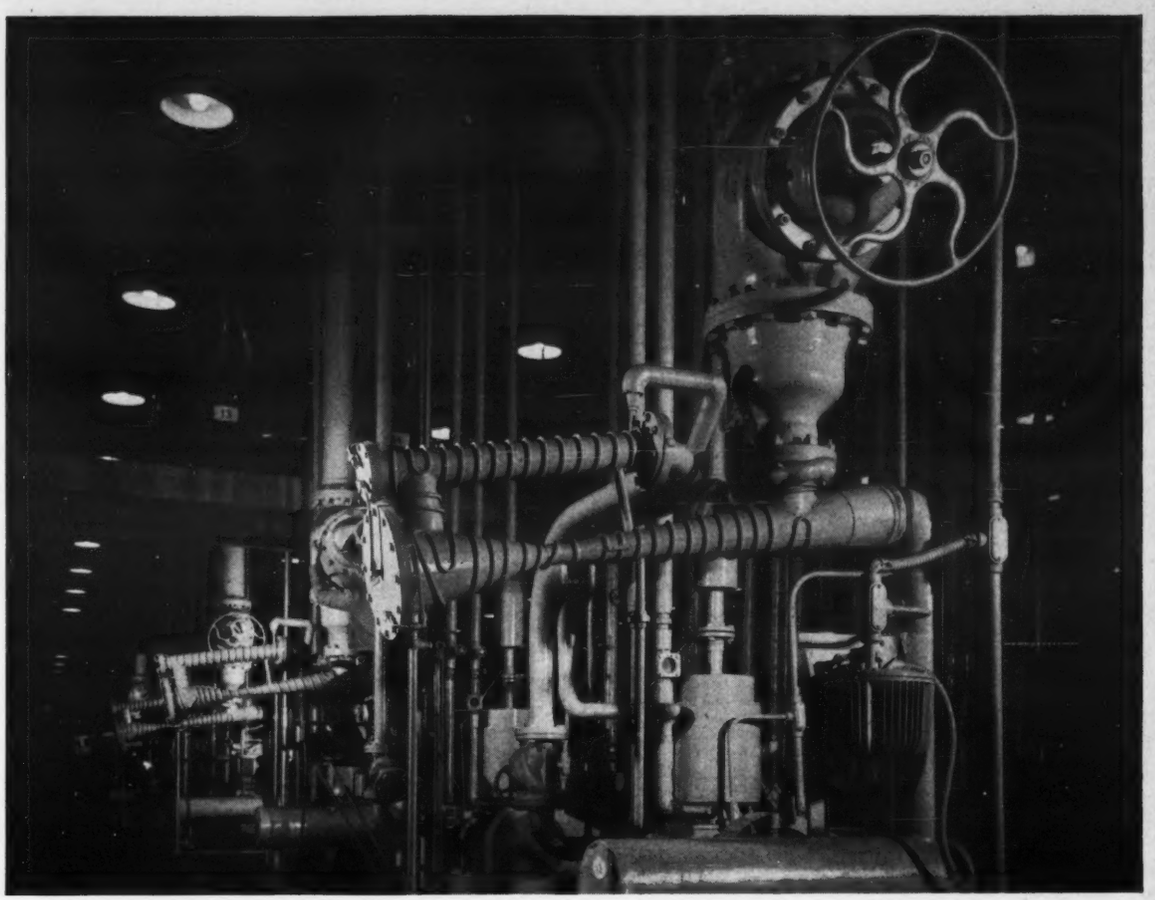
Bul T-9 can be obtained from Yarnall-Waring Co., Dept. CP, Chestnut Hill, Philadelphia 18, Pa. When inquiring specify 7202 on form opposite last page.

Washing device prevents bed fouling of filters, ion exchange units

Experiences with sub-surface washer in demineralizers, Zeolite softeners and filters are described in eight-page technical reprint. Booklet reviews causes of fouling and problems encountered in various installations. Steps leading to development of the washer and cutaway drawing of unit are also included.

Tech Reprint T-139 is issued by Graver Water Conditioning Co., Div. of Graver Tank & Mfg. Co., Inc. Dept. CP, 216 W. 14th St., New York 11, N.Y. When inquiring about manufacturer's product, reader may simply check 7203 on form opposite last page.

"Pulsation dampeners? . . . what are they?"



These Crane valves holding 25 microns absolute pressure after 2 years on vacuum service

The Case History—Valves frequently are the most critical points in a vacuum system. But that's not the case with this large Southern light metals refiner.

This plant reports no trouble or expense over a 2-year period in maintaining a vacuum of less than 25 microns absolute for its distillation process.

The tight-holding valves installed about 2 years ago on the lines from vacuum pumps shown above are Crane No. 1611 diaphragm pattern. These 12-in. packless iron body valves are used about once daily.

They've allowed no in-leakage at the seat, bonnet-joint, or through the diaphragm. No maintenance whatever has been given the valves since installed. They operate easily and look good for such service indefinitely.

This high efficiency performance is mainly due to Crane separate disc and diaphragm design. The diaphragm used as a bonnet seal only is not subject to destructive crushing. Conventional type disc and body seat provide a metal-to-Neoprene seating that's ideal for vacuum and hard-to-hold fluids.

Moderately priced, Crane diaphragm valves deserve your consideration for many ordinary services, as well as sludges, slurries and corrosive fluids. They are made in a wide variety of body and trim materials, in ½ to 12 in. sizes.

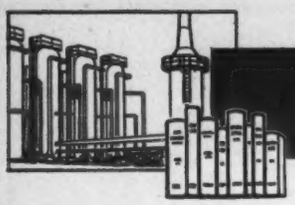
Ask your local Crane Representative about them, or write to address below for literature.

CRANE VALVES & FITTINGS

PIPE • KITCHENS • PLUMBING • HEATING

Since 1855—Crane Co., General Offices: Chicago 5—Local Service Everywhere Through Branches & Wholesalers

When inquiring check 7204 opposite last page



processing and engineering data

162

Vapor Pressure of Nitroparaffins

Data courtesy of COMMERCIAL SOLVENTS CORP.

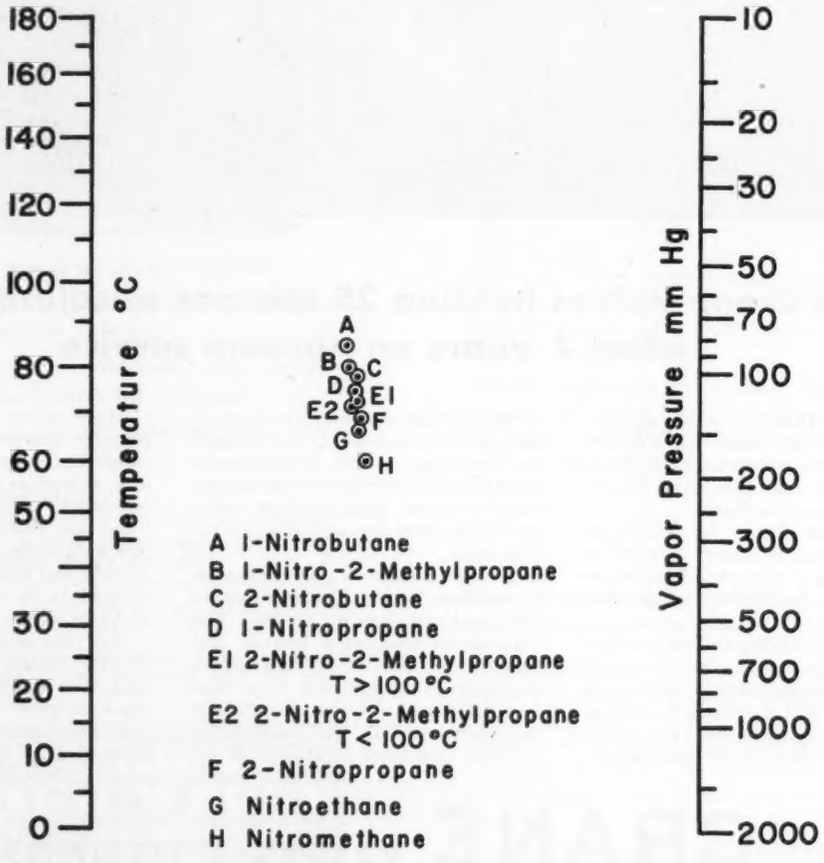
Nomograph by BRUCE FADER, Associate Editor

This nomograph provides for fast and accurate estimation of vapor pressure for pure nitroparaffin compounds.

Typical Example

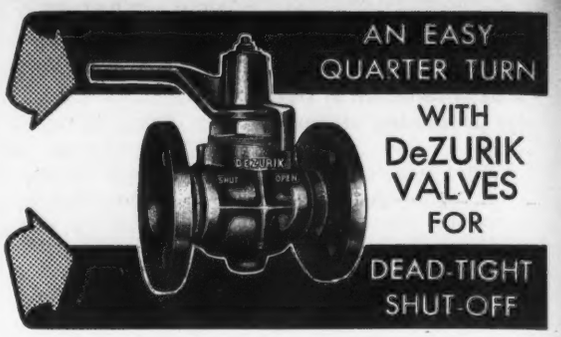
What is the vapor pressure of 1-nitropropane at a temperature of 90°C?

Connect 90 on temperature scale with gage point D (for 1-nitropropane) by using a straightedge. Intersection of this straightedge with vapor pressure scale shows that vapor pressure will be 200 mm Hg.

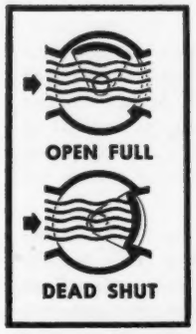


A 1-Nitrobutane
B 1-Nitro-2-Methylpropane
C 2-Nitrobutane
D 1-Nitropropane
E1 2-Nitro-2-Methylpropane T > 100 °C
E2 2-Nitro-2-Methylpropane T < 100 °C
F 2-Nitropropane
G Nitroethane
H Nitromethane

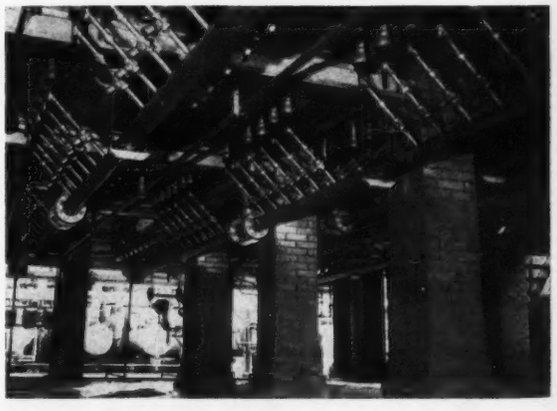
CUT HERE AND FILE



DeZURIK VALVES open wide or close dead-tight with an easy quarter-turn of the lever. Their rubber-faced plugs seal tight despite grit or other solid particles in the flow. On line after line, they minimize maintenance, reduce down-time, completely eliminate many troublesome valve problems.



DeZURIK's Exclusive Eccentric Action combines e-a-s-y operation with leak-free closure. The eccentric-shaped plug meets the eccentric-raised seat *only* at the moment the valve is closed. At all other times the plug turns freely . . . . without sticking, without binding, *WITHOUT LUBRICATION!*



DeZurik Valves are manufactured in sizes from ½" thru 20" in a full range of materials. They can be supplied with lever, gear, pneumatic, hydraulic or electric operators.

Write Dept. P-8 for complete details. Representatives in all principal cities.

DeZURIK SHOWER CO. Sartell, Minn.

When inquiring check 7205 opposite last page

Collection of noxious dust and fumes discussed

Illustrated catalog covers basic type of dust collectors offered by manufacturer. How this equipment is applied to collection of noxious dust, lint, chips, powders, and fumes in industry is shown through use of installation photographs and text. Types of collectors discussed include cabinet cloth filter, cyclone separator, and exhausters and blowers.

Cat 39 is available from Dept. KP, Torit Manufacturing Co., Dept. CP, 287 Walnut St., St. Paul 2, Minn. When inquiring specify 7206 on form opposite last page.

Describes improved heat exchangers

Improved design single-pass and two-pass heat exchangers are described in illustrated two-page bulletin. Included are data on features, construction, and materials of construction. Sizes available and dimensions are given in tabular form.

Bul Supplement 12-HS is issued by Schutte and Koerting Company, Dept. CP, Cornwells Heights, Bucks County, Pa. When inquiring specify 7207 on form opposite last page.

Shows polyurethane tests for orthopedic fittings

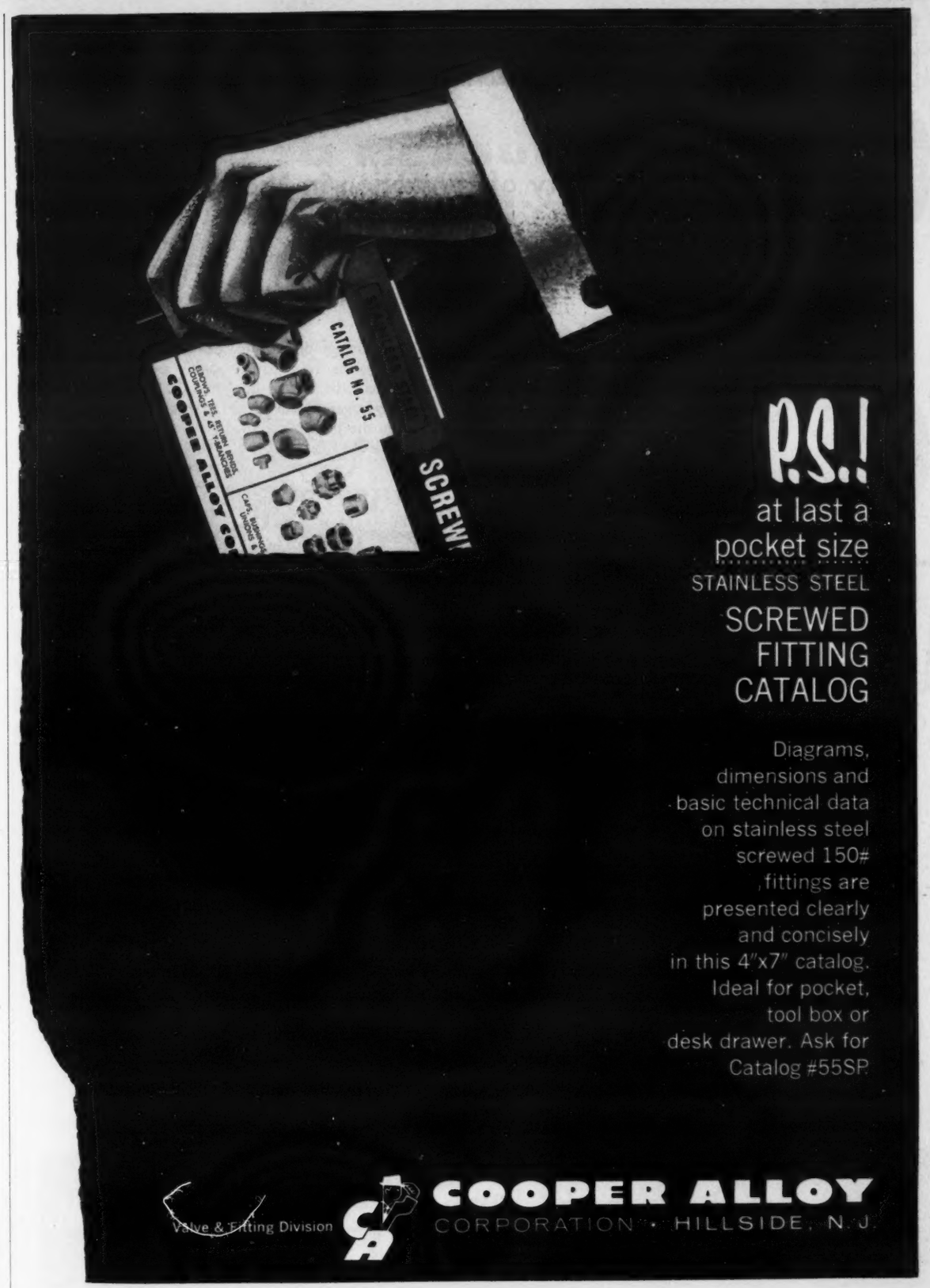
Spring issue of laboratory periodical features an article on testing and production of polyurethane foams for orthopedic fittings, artificial limbs, etc. Other articles deal with partition chromatography unit, new instruments and laboratory devices.

Vol. 25, No. 1 of "The Laboratory" is issued by Fisher Scientific Co., Dept. CP, 717 Forbes St., Pittsburgh 19, Pa. When inquiring specify 7208 on form opposite last page.

Portable hydraulic bender for pipe, tubing shown

Numerous photographs are used to illustrate eight-page brochure covering company's hydraulic benders for conduit, tubing, pipe, and bus bars. Hand benders, pipe pushers, and power pumps are shown.

Form E-221M is issued by Greenlee Tool Co., Div. of Greenlee Bros. & Co., Dept. CP, 2136 12th St., Rockford, Ill. When inquiring specify 7209 on form opposite last page.


CATALOG No. 55
SCREW
P.S.!
at last a pocket size
STAINLESS STEEL
SCREWED FITTING CATALOG
Diagrams, dimensions and basic technical data on stainless steel screwed 150# fittings are presented clearly and concisely in this 4"x7" catalog. Ideal for pocket, tool box or desk drawer. Ask for Catalog #55SP
Valve & Fitting Division
COOPER ALLOY
CORPORATION · HILLSIDE, N.J.

When inquiring check 7210 opposite last page

Solubility of Hydrogen in Nickel

By D. S. DAVIS

Professor of Chemical Engineering
Virginia Polytechnic Institute

From a study of solubility of hydrogen in steel, Armbruster[1] determined the solubility of hydrogen in pure nickel at low pressures and temperatures between 400 and 600°C. His data are correlated by

$$\log \frac{S}{p^{0.5}} = \frac{645}{T} + 1.732$$

where —

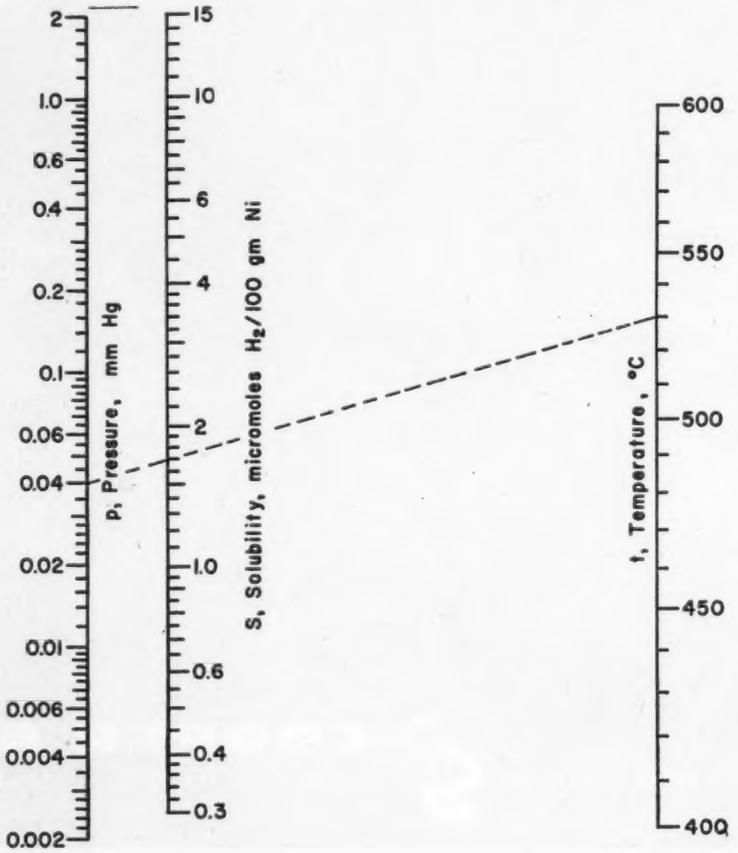
S =	solubility of hydrogen in nickel	micromoles/100 g
p =	pressure	mm Hg
T =	temperature	°K

This nomograph, constructed by well-known methods[2], solves the equation readily and accurately. On the chart the broken line shows that 1.7 micromoles of hydrogen dissolve in 100 grams of pure nickel when the pressure is 0.04 mm Hg and the temperature is 530°C.

LITERATURE CITED

(1) ARMBRUSTER, M. H., *Jour Am Chem Soc*, Vol 65, p 1043 (1943)

(2) DAVIS, D. S., "Nomography and Empirical Equations," Ch 6, Reinhold Publishing Co., New York (1955)



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Available from VANTON!

3 LINES OF PLASTIC
PIPE,
FITTINGS
AND
VALVES

PVC (Unplasticized, Unmodified, Polyvinyl Chloride)
For outstanding chemical resistance.

Styrene Copolymer
For exceptional impact strength.

Buna N (Acrylonitrile-Butadiene)
For excellent temperature resistance.

Vanton, with many years of pioneering experience in the manufacture of plastic pumps, now makes available pipe, fittings and valves in the above basic materials. These plastic compounds have been selected to offer as broad a coverage as possible with respect to the application requirements of the process industry.

- Excellent corrosion resistance
- Non-contaminating properties
- Excellent mechanical performance
- Ease of installation
- Excellent electrical and insulating properties
- Insulating properties
- Economical
- High temperature resistance

Write for Catalog PE 101

VANTON
PUMP & EQUIPMENT CORP.
201 Sweetland Ave. Hillside, N. J.
Division of Cooper Alloy Corporation

When inquiring check 7211 opposite last page

Corrosion protection for water tanks

System employing a combination of cathodic protection and chemical treatment to control corrosion of water storage tanks is outlined in one-page publication. System is particularly suited for storage tanks used for water for fire emergencies. System requires a minimum of anodes and reduced power consumption.

Publication TP-111-E is issued by Electro Rust-Proofing Corp., Dept. CP, 30 Main St., Belleville 9, N.J. When inquiring specify 7212 on form opposite last page.

Faster, more uniform cooling with cooling roll inserts

Cooling roll inserts designed for equipment used in polyethylene laminating, synthetic rubber, and web printing presses, are covered in four-page bulletin. Units consist of a metal drum having flexible rubber ribs vulcanized to it. Ribs direct flow of cooling water and make it spiral at high velocity close to surface to be cooled.

Bul 561 is issued by F. R. Gross Company, Dept. CP, PO Box 2044, Akron 11, Ohio. When inquiring specify 7213 on form opposite last page.

Contains full specs for belt idler

Six-page catalog is printed in two colors. It contains complete specifications and illustrations of series of belt idlers for medium loads or intermittent operation. Essential features and design are fully explained.

Folder 2516 is issued by Link-Belt Company, Dept. CP, 307 N. Michigan Ave., Chicago 1, Ill. When inquiring specify 7214 on form opposite last page.

Contains definitions of 101 atomic terms

Illustrated with drawings and photographs, 22-page booklet lists the definition of 101 atomic terms. Said to be the first of its kind, the booklet has the terms arranged alphabetically. Included are such interesting slang terms like cutie-pie, pig, and coffin.

Booklet "101 Atomic Terms" is available on letterhead request to Esso Research and Engineering Co., Dept. CP, 15 W. 51st St., New York 19, N.Y.

TO MEASURE SMELL....
Peerless Manufacturing Company uses PENBERTHY GAGES
The Peerless Type "MP" natural gas odorizer, shown here, is a complete packaged unit which can be installed easily. Hundreds of such installations are providing constant odorizing despite variations in flow, temperature and pressure..
IMPORTANT to the Gas Companies, from a liability standpoint, is the dependable means of maintaining accurate records of daily odorant consumption. This is done by means of the Penberthy Reflex Liquid Level Gages... shown mounted on the small calibration tank. Two calibration scales are attached to the gage glass. One records gallonage in the large storage tank and the other in the small.
Like Peerless, other equipment manufacturers depend upon Penberthy Gages for clear accurate readings, durable service and minimum maintenance. This is because of the extra exclusive features incorporated into the advanced engineering and construction of Penberthy Gages and Gage Valves. Let us send you complete detailed information on the complete line.
WRITE FOR YOUR COPY OF CATALOG 35.
PENBERTHY MANUFACTURING CO.
Division of the Buffalo-Eclipse Corporation
1242 Holden Avenue Detroit 2, Michigan
There's certain satisfaction in PRODUCTS BY PENBERTHY
GAGES
EJECTORS
EDUCTORS
EXHAUSTERS
SYPHONS
ELECTRIC SUMP PUMPS
CYCLING JET PUMPS
INJECTORS
When inquiring check 7215 opposite last page

Relative Humidity Nomograph

By GEORGE E. MAPSTONE

Boksburg North, Transvaal, South Africa

and

J. T. MUNDAY

Lane Cove, New South Wales, Australia

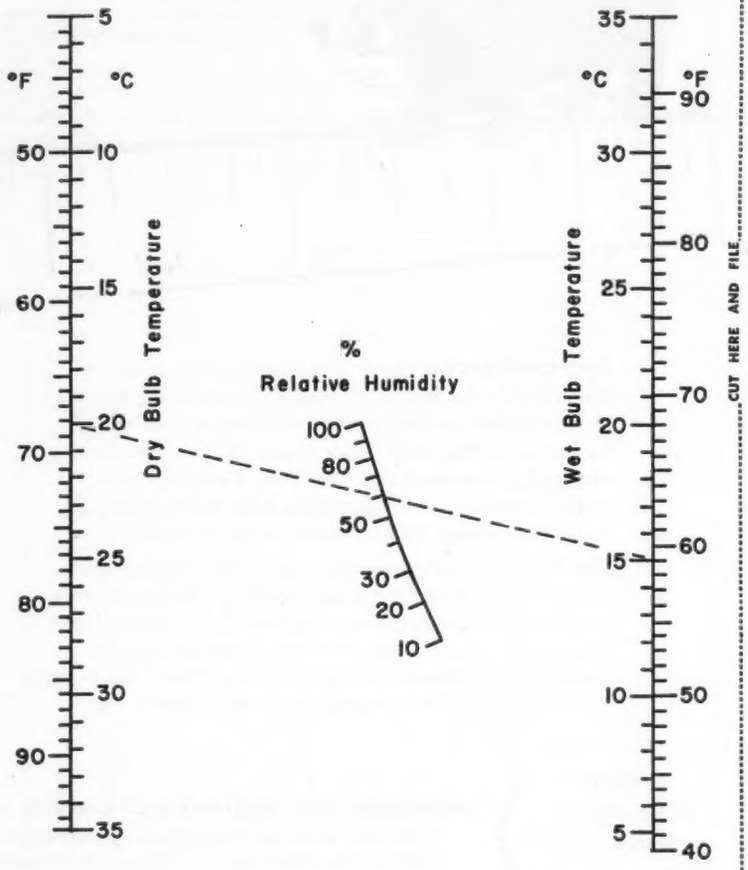
Edited by D. S. DAVIS

Professor of Chemical Engineering
Virginia Polytechnic Institute

Percent relative humidity of air is customarily determined from the wet and dry bulb thermometer readings with the aid of tables prepared for use with the psychrometer employed. This chart can be used instead of these tables for interpreting results.

If dry bulb temperature is 68°F and wet bulb temperature is 59°F, what is the relative humidity?

Index line shows that if these readings were made with a ventilated psychrometer, relative humidity is 59 percent.



LITERATURE CITED

"Gas Engineers' Handbook," McGraw-Hill Book Co., pp 542-3, New York (1934)

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Pumping Progress Report

FOR CHEMICAL ENGINEERS

An advertisement prepared by The Aldrich Pump Co., Member of Hydraulic Institute, U.S.A.

SPACE, in many pump installations, is a major problem. Another is the necessity for special foundations. For new installations these factors may dictate elaborate construction; for replacement or modifications of existing systems, expensive piping and equipment changes.

COMPACTNESS OF DESIGN, while often desirable, is not necessarily the answer. Simplicity of design may be a better solution.

SIMPLICITY OF DESIGN brought about the first Inverted Triplex and Quintuplex and ultimately Septuplex and Nonuplex Pumps. This Aldrich design innovation brought to users economies of space, maintenance and operation they had never known. And even more important, Multiplex pumps brought new freedom from pulsation.

INVERTED PUMP DESIGN permits the use of less expensive foundations. With the crankshaft located near the floor there is no need to raise the driver or lower the pump. Then, too, inverted pumps require fewer square feet of floor space than conventional pumps.

MAINTENANCE COSTS ARE REDUCED. Fluid-end, where most work is done, is at chest level. Sectionalization, another Aldrich innovation, and parts standardization permit ease and economy of inspection or replacement.

TELL US ABOUT YOUR PUMPING PROBLEM. The chances are that one of our standard pumps — or a modification — will do your job. Detail your problem and we'll send you our Data Sheet describing the Direct Flow Pump we recommend. Write to: The Aldrich Pump Company, 23 Gordon Street, Allentown, Pa.

When inquiring check 7216 opposite last page

Electroplating use of KCN told of in bulletin

Advantages of using company's potassium cyanide solution in plating copper, silver, cadmium, zinc, or gold are enumerated in four-page folder. Ease of handling, safety, and quality control are emphasized.

Bul C-6-227 is available from Koppers Co., Inc., Dept. CP, 1301 Koppers Bldg., Pittsburgh 19, Pa. When inquiring specify 7217 on form opposite last page.

Special designs, accessories for industrial trucks

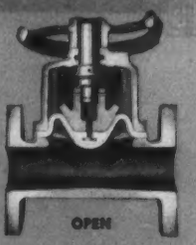
Three three-color bulletins present special designs and special accessories for industrial trucks. Included, for example, are hydraulic drum forms, multiple keg handling devices, revolving carriages, up-enders, dumping arrangements, etc. Engineering features of trucks which permit use of these designs and accessories are detailed.

Buls SP-7 Rev 2, SP-6 Rev 2, and F2 Rev 5, are issued by Towmotor Corp., Dept. CP, 1226 E. 152nd St., Cleveland 10, Ohio. When inquiring specify 7218 on form opposite last page.

"We think we should tell you, Sweeney, that you're making us all nervous by rubbing that rabbit's foot so often!"

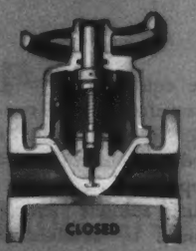
Flow Characteristics
similar to gate valves

- Streamlined straight-through flow
- Minimum pressure drop
- Handles viscous materials without stoppage
- May be rodded or brushed



Advantages
of a diaphragm valve

- Positive closure even with gritty or fibrous materials
- No pockets to trap sludge
- Bonnet mechanism completely isolated from fluid in line
- Completely self-draining
- Simple maintenance



GRINNELL-SAUNDERS
STRAIGHTWAY
DIAPHRAGM VALVE

For handling viscous materials, slurries, sludges, solids in suspension, sewage and corrosive chemicals, Grinnell now offers a valve which has all the advantages of a diaphragm valve with the added benefits of straight-through flow.

The Straightway Diaphragm Valve* is made in sizes from ½" to 8", screwed or flanged ends, either hand wheel or power operated.
A variety of body, lining and diaphragm materials are available to meet practically all requirements. Descriptive folder gives all details.

*Patented

GRINNELL COMPANY, INC., PROVIDENCE, RHODE ISLAND
Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves Grinnell-Saunders diaphragm valves • pipe • prefabricated piping plumbing and heating specialties • water works supplies • industrial supplies Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

GRINNELL COMPANY, INC.
236 West Exchange St., Providence, R. I.

Kindly send me a copy of bulletin describing Grinnell-Saunders Straightway Diaphragm Valves.

Name_____
Title_____
Company_____
Address_____
City_____ State_____

When inquiring check 7219 opposite last page

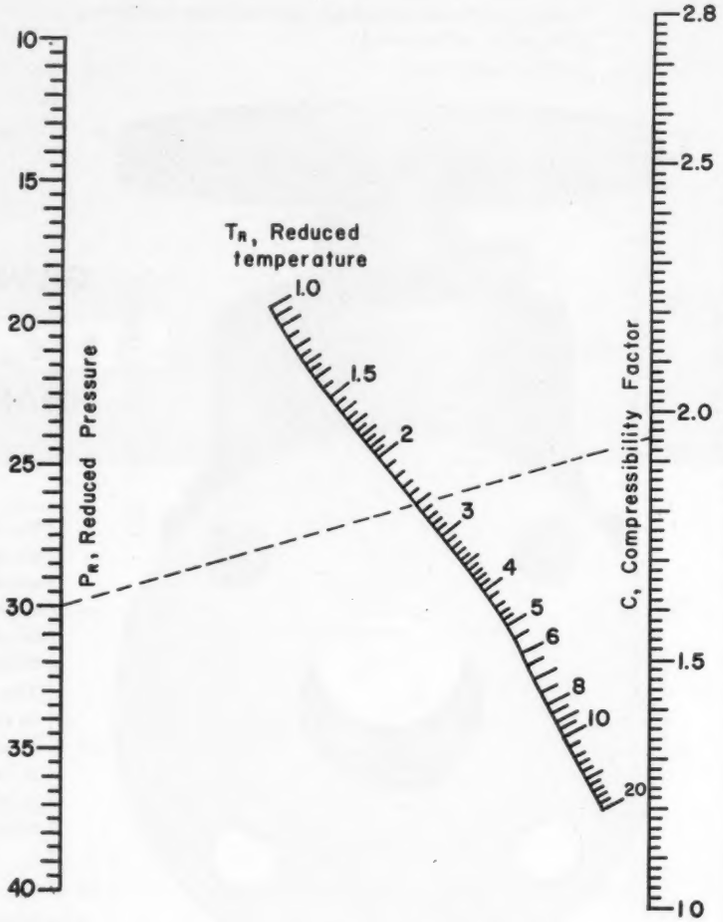
Compressibility Nomograph For High Pressures

By D. S. DAVIS

Professor of Chemical Engineering
Virginia Polytechnic Institute

The equation pv = CnRT is satisfactory for non-ideal gases. Compressibility factor C depends on the reduced temperature (T_R, which is the actual absolute temperature divided by absolute critical temperature) and on the reduced pressure (P_R, actual pressure divided by critical pressure). To determine C for high values of reduced temperature and reduced pressure, use the accompanying nomograph constructed by methods previously described[1] and based on a family of curves by Dodge[2].

What is compressibility factor for a non-ideal gas when the reduced pressure is 30 and the reduced temperature is 2.5? Connect 30 on the P_R scale and 2.5 on the T_R scale with a straight line. Read compressibility factor as 1.95 on the C scale.



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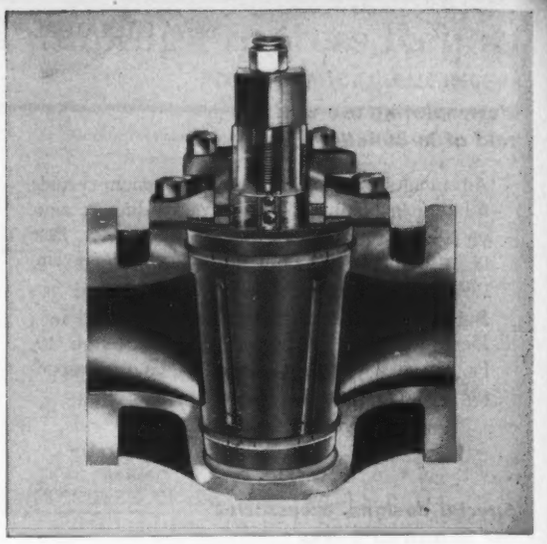
(1) DAVIS, D. S., "Nomography and Empirical Equations," Ch. 10, Reinhold Publishing Corp., New York (1955)
(2) DODGE, B. F., "Chemical Engineering Thermodynamics," p 162, McGraw-Hill Book Co., Inc., New York (1944)



ROCKWELL-
Nordstrom VALVES
CUT COSTS
on any
corrosive service

Corrosion resisting metals *plus* lubricant protection make Rockwell-Nordstrom lubricated plug valves a better investment than any other valve you've ever used on processing lines or equipment. Available in semi-steel, steel, stainless steel, Ni-Resist, bronze and Monel, Rockwell-Nordstrom valves assure trouble-free dependability on even the most corrosive service. They cost no more to buy, often less, than ordinary valves—and they continue to save money year after year because:

PRESSURIZED LUBRICANT SEALING eliminates the uncertainties of metal-to-metal seating. Thin, tough film of pressurized lubricant holds lightest gases or heavy slurries.

SEAT IS NEVER EXPOSED to corrosive-erosive line material . . . cuts reseating costs.

LESS DOWN TIME because galled or jammed valves are eliminated. Powerful cushion of pressurized lubricant seats plug for quarter-turn operation.

No matter where you use Rockwell-Nordstrom valves they will save you money. Write for more details.

ROCKWELL
MANUFACTURING COMPANY
Pittsburgh 8, Pa.
40th YEAR *of lubricated plug valve leadership*

When inquiring check 7220 opposite last page

Facts and figures on drum linings

Twenty-page booklet describes methods of lining drums with flexible plastics. Covering such topics as advantages, necessary thickness, methods of inserting and closing liners and other packaging items, and notes on various products and materials that are being handled with liners, booklet contains table of properties of various plastics. Similar table for laminates is shown.

"Facts and Figures on Plastic Packaging Products" is issued by Protective Lining Corp., Dept. CP, 22 Woodhull Street, Brooklyn 31, New York. When inquiring specify 7221 on form opposite last page.

Lists carbon and graphite rods for spectroscopy

In addition to listing special pure materials for use in spectroscopy, 24-page booklet in two colors includes description of carbon and graphite rods for spectrographic use. Price and availability is given for series of chemicals of spectrographic purity. Materials run from copper group — Cu, Ag, Au to rare earths and rare earth oxides.

Catalog SS-8-55 is issued by Jarrell-Ash Co., Dept. CP, 26 Farwell St., Newtonville, Mass. When inquiring specify 7222 on form opposite last page.

Filter handles 2000 gpm in small space

Specifications, flow rates, and engineering drawings of high-capacity filter are presented in four-page catalog. Unit is designed to handle various liquids, water, and fuels at flow rates up to 2000 gpm. Space requirements are only 2½ ft diameter by 4½ ft high.

Cat MK-170 is issued by the Cuno Engineering Corp., Dept. CP, Meriden, Conn. When inquiring specify 7223 on form opposite last page.

Selection of mixing equipment subject of bulletin

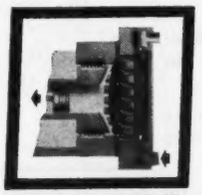
System of determining mixing and coagulating requirements and selecting proper equipment are subjects of eight-page bulletin. A selection table for company's equipment is included.

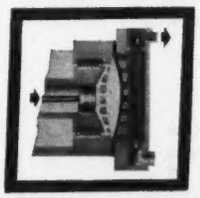
Bul W-700 is issued by Infilco Inc., Dept. CP, PO Box 5033, Tucson, Ariz. When inquiring specify 7224 on form opposite last page.

CONTROLLED-VOLUME PUMPING with

NO STUFFING BOX PROBLEMS!

The Pulsafeeder, in combining the good features of both piston and diaphragm pumps, provides an unusually dependable means of precision pumping. There is no stuffing box, hence the usual problems of maintenance and repacking associated with plunger-type metering pumps do not exist. The product being pumped is isolated from the pump's working parts by a hydraulically balanced diaphragm and is kept safe from contamination and leakage to atmosphere.


SUCTION STROKE


DISCHARGE STROKE

Positive displacement is achieved by a piston reciprocating within an accurately sized cylinder at an established stroke length, displacing an exact volume of hydraulic oil. By means of this oil, the piston moves the diaphragm alternately backward and forward. The displacement of this diaphragm travel takes in the liquid on the suction stroke of the piston and discharges a like amount of liquid on the discharge stroke of the piston.

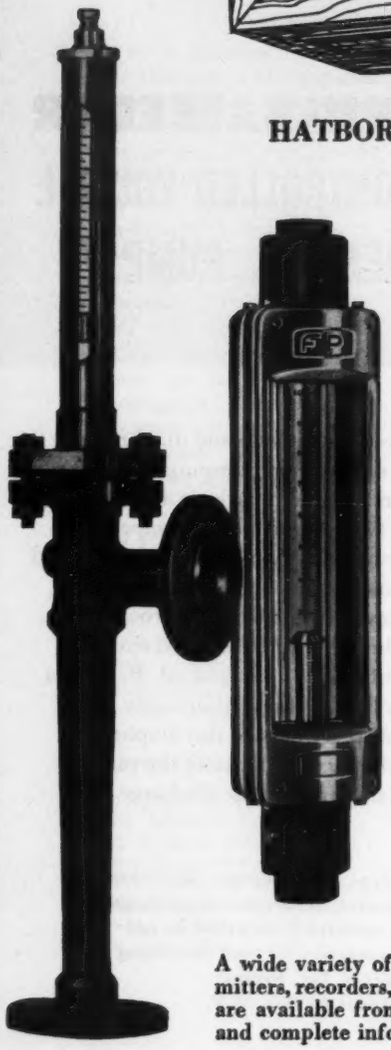
WRITE FOR BULLETIN 440 *with typical applications, flow charts, description and specifications of models of various capacities and constructions. Inquiry Data Sheet included from which we can make specific engineering recommendation for your processing requirement. Write Lapp Insulator Co., Inc., Process Equipment Division, 665 Wilson Street, Le Roy, N. Y.*

Lapp

When inquiring check 7225 opposite last page

F&P Flowmeters

HATBORO, HOUSTON, CHICAGO OR LOS ANGELES



Predictable performance floats permit Flowrator Meters with true percentage scales to be carried in stock. You benefit from F&P's years of hydraulic research by getting accurate meters quickly.

Greater flexibility of use is assured by the ease and simplicity with which new flow factors may be determined on changes in fluid service. Capacity may also be altered by revising metering float weight and yet, the same metering accuracy is maintained.

Advantages of specifying F & P Meters:

- **Highest quality—same as made-to-order, extended shipment instruments.**
- **Prompt delivery—most items shipped the same day the order is received.**
- **Economy—standardization on percentage scales and interchangeable parts, minimizes spare part problems.**

A wide variety of flow indicators, purgemeters, transmitters, recorders, controllers and pressure instruments are available from stock. Write today for Catalog #2 and complete information.

FP FISCHER & PORTER

LA 1187

2586 County Line Road, Hatboro, Pa.

In Canada: Fischer & Porter (Canada) Ltd. Toronto 15, Ont.

When inquiring check 7226 opposite last page

NEW LITERATURE

Adhesive selector

Chart, 14 x 22", gives recommendations for adhesives to use in bonding both similar and dissimilar materials. Relative strength of ultimate bond, method of application, and type of bonding technique to be used for twenty-four separate materials are given. These materials include rubber, paper, glass, and cotton.

"Adhesive Selector Chart" is available from Daubert Chemical Company, Dept. CP, 333 N. Michigan Ave., Chicago 1, Ill. When inquiring check 7227 on form opposite last page.

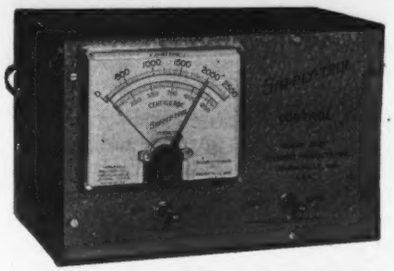
Shows how insulation is made and used

How manufacturer's Thermobestos pipe and block insulation is made from asbestos, diatomaceous silica, and lime, and how it is used are subject of 12-page illustrated booklet. Separate sections deal with prefabrication of fittings, physical and thermal properties, and tables of available sizes and thicknesses. Transmission tables are presented.

Bul IN-169A is issued by Johns-Manville, Dept. CP, 22 E. 40th St., New York 16, N.Y. Check 7228 on form opposite last pg.

"Which one of these goes to the water cooler?"

SIMPLYTROL AUTOMATIC PYROMETER



10 temperature ranges cover from -75° to 3000°F.

Several special ranges to -400°F.

Cat No. 4531 0/2500° F.
Price $132.00

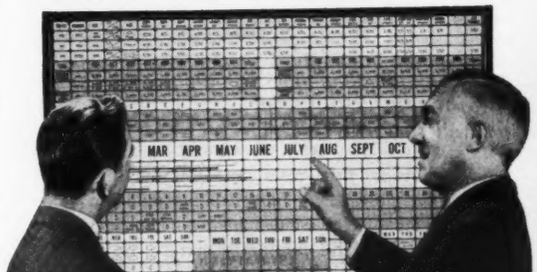
Thermocouple type Automatic Pyrometer for controlling temperature in furnaces, ovens, and processes. The Simplytrol is economical and reliable with few moving parts. There are no vacuum tubes. The regular load relay is S.P.D.T. 5 Amps. Optional heavy duty relays to 40 Amps.

10 temperature ranges cover from −75° to 3000° F. Several special ranges to −400° F. "On & Off" control for holding the desired temperature works on gas, oil or electric heat. Indicating meter-relay is medium high resistance and has bimetal cold junction compensation. For use with all standard thermocouples. Accuracy 2%. "Auto-Limit" switch changes Simplytrol from automatic controller to limit pyrometer for safety shut down or warning. Cabinet: 6½ x 6½ x 9½ inches. Also flush panel mount models. Send for new Bulletin G-7 for more data. Assembly Products, Inc., Chesterland 36, Ohio (West Coast: Desert Hot Springs 36, Calif.)

See us at WESCON SHOW, AUG. 21-24, Los Angeles.

When inquiring check 7229 opposite last page

How To Get Things Done



BOARDMASTER VISUAL CONTROL

Gives you a Graphic Picture of your operations, spotlighted in color. You See what is happening at a glance. Facts at eye level — saves you time, prevents errors.

Simple, flexible — easily adapted to your needs. Easy to operate. Type or write on interchangeable cards, snap in grooves. Ideal for production, scheduling, sales, traffic, inventory, etc. Made of metal. Compact, attractive.

Complete Price $49.50 Including Cards

FREE **24-Page Illustrated Booklet AA-10 Mailed Without Obligation**

GRAPHIC SYSTEMS **55 WEST 42nd STREET NEW YORK 36, N. Y.**

When inquiring check 7230 opposite last page

LUBRIPLATE No 630-AA IS PRACTICALLY A UNIVERSAL LUBRICANT

—says THE SPOKANE PORTLAND CEMENT CO.

"With the introduction of LUBRIPLATE No. 630-AA, we were able to satisfy all our needs for solid type lubricants with only two LUBRIPLATE Products. LUBRIPLATE No. 630-AA might almost be considered a universal lubricant. Furthermore, it has effected marked savings in both lubricants and labor!"

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE

LUBRIPLATE LUBRICATION MAKES CARS AND TRUCKS RUN BETTER AND LAST LONGER

LUBRIPLATE H.D.S. MOTOR OIL . . . THE OIL THAT NEEDS NO ADDITIVES

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

When inquiring check 7231 opposite last page

Glass heat exchanger design manual

Basic information on characteristics, design, and operation of Pyrex-brand modular shell and tube heat exchangers is presented in 16-page manual. Individual sections tell how to 1) select, 2) lay out, 3) engineer, 4) order heat exchange systems. Manual includes drawings, charts, and information on fluid constants, friction losses, surface area calculations, and thermal gradients.

Bul PE-33 is issued by Plant Equipment Sales, Corning Glass Works, Dept. CP, Corning, N.Y. When inquiring specify 7232 on form opposite last page.

Theory of homogenization presented in bulletin

Six-page booklet covers use and selection of industrial homogenizers and includes brief discussion on theory of homogenization. Booklet also has cutaway views showing construction of units. Over sixty types of products which can be improved by homogenization are listed.

Bul H-55 is issued by Manton-Gaulin Manufacturing Co., Dept. CP, 44 Garden St., Everett 49, Mass. When inquiring specify 7233 on form opposite last page.

Details fabricating facilities with photographs

Custom fabricating facilities and services of company are detailed in 12-page brochure through the use of equipment and process photographs. Information on non-destructive testing of tank and vessel welds is included.

Brochure B-12 is issued by Puget Sound Fabricators, Inc., Dept. CP, 3670 E. Marginal Way, Seattle 4, Wash. When inquiring specify 7234 on form opposite last page.

Describes double suction pump, medium and high head

Liberal use of photographs helps describe bottom suction and side suction pumps in eight-page catalog. Cross-sectional views detail construction. Installation in water treatment and other water pumping applications are pictured.

Cat A-155 is available from C. H. Wheeler Mfg. Co., Economy Pump Div., Dept. CP, 19th and Lehigh Ave., Philadelphia 32, Pa. When inquiring specify 7235 on form opposite last page.

THIS IS THE STORY of three men and a VALVE. Joe, a chemical engineer, needed valves that could handle tough corrosives. Bill, a refining engineer was looking for valves that gave a positive shut-off. Tom, working for a large industrial firm, needed valves that sealed both upstream and downstream. All three solved their problems by specifying Hamer Visible Wedge Valves. These remarkable valves combine the double sealing action of precision metal-to-metal fit augmented by dependable seal rings. The wedges are trimmed with nickel, while seats are trimmed with stainless steel to withstand the roughest corrosive conditions. The full-view wedges are handwheel operated --can't blow out or drop on a toe. The wedges pivot so no lifting is necessary. So if your plans require long service, sure-seal shut-off valves, by all means specify HAMER VISIBLE WEDGE VALVES.

P.S. For descriptive literature, write:

Hamer **VALVES, INC.**

2919 Gardenia Ave., Long Beach 6, California
Representatives Throughout the World.

When inquiring check 7236 opposite last page

• For Standard Services

"BELMONT"

asbestos • copper-asbestos • flax

In Crisscross braid, the strands crisscross from the surface diagonally through the body of the packing, each strand becoming an integral part of the stronger structure. Lubrication is locked in. Controlled porosity is obtained. Seals are accomplished with less gland pressure. Packing life is longer. Belmont Bulletin 4-P-8.

• For All-Chemical Service

"CHEMISEAL"

TEFLON Packings

The only positively corrosion-resistant Compression type packing available to industry today. Pure TEFLON—it is impervious to *all* chemicals except molten alkali metals, fluorine at elevated temperatures and chlorine trichloride.

Available in three types—TEFLON filament, "dragon fur", and blue or white asbestos treated with TEFLON suspensoid.

CRISSCROSS Braid gives mechanical strength and resilience to match chemical resistance. Extremely antihesive, TEFLON requires no lubricant. Lasts for months in service where other packings fail in hours. U.S.G. Bulletin TP-1155.

The Belmont Packing & Rubber Co.
Butler & Sepviva Sts., Phila. 37, Pa.

United States Gasket Co.
Camden 1, New Jersey

U.S. GASKET • BELMONT PACKING

When inquiring check 7237 opposite last page

NEW LITERATURE

Counteract corrosive compounds in fuel oil

Four-page publication describes a series of additives used for counteracting the corrosive compounds of sulfur, vanadium, and sodium, so troublesome to operators of high-pressure boilers and other equipment using fuel oil. A number of case histories are discussed in bulletin.

Bulletin on fuel oil additives is issued by R. S. Norris Associates, Dept. CP, Larchmont, N.Y. When inquiring specify 7238 on form opposite last page.

Comprehensive catalog on stainless and alloys

Corrosion-resistant alloys and stainless steels are covered in detail in 102-page catalog. Corrosion data, chemical compositions, mechanical properties, heat resistance, and impact and abrasion resistance of a variety of metals are covered.

Catalog 175-A is issued by Electrical Steel Foundry Company, Dept. CP, 2141 N.W. 25th Ave., Portland 10, Oregon. When inquiring reader may simply specify 7239 on form opposite last page.

Aromatic organics tabulated in product folder

Four-page folder tabulates company's offerings of aromatic organic compounds and pilot plant products available on order. Fields of research interest, custom manufacturing equipment, and special facilities are also treated. A brief description and suggested uses for listed products are given.

Bul No. 2 is issued by Maumee Chemical Co., Dept. CP, 2 Oak St., Toledo 5, Ohio. When inquiring reader may simply specify 7240 on form opposite last page.

Oil separator features open-type hood

Particularly suitable for handling fats and oils, heavy-duty centrifugal oil separator is described in two-page bulletin. Cutaway diagrams and technical data are included. Unit features open-type hood, which permits easy cleaning and observation of material being processed.

Bul 2142 is issued by Centrico Inc., Dept. CP, 75 West Forest Avenue, Englewood, N. J. When inquiring specify 7241 on form opposite last page.

When inquiring check 7242 opposite last page

Here's "What You Should Know About Wooden Pallets"

Offering such information as types of expendable pallets, construction standards, types of fastenings, tolerances, and a glossary, six-page brochure explains most efficient use of wooden pallets. Brochure contains diagrams of various pallet types, giving specifications and construction data.

"What You Should Know About Expendable Pallets" is issued by the National Wooden Pallet Manufacturers Association, Dept. CP, Barr Building, Washington 6, D.C. When inquiring specify 7243 on form opposite last page.

Cites effect of greater gas supplies on industry in Pacific Northwest

New and improved processes which can be expected in Pacific Northwest industry, due to availability of greater quantities of natural gas, are explained in 12-page reprint of technical paper.

To obtain Paper No. 56-S-14, "Processes and Product Improvements to be Anticipated with Natural Gas" remit 50c direct to The American Society of Mechanical Engineers, Dept. CP, 29 W. 39th St., New York 18, N.Y.

Here's how 1.5 million lb of paper are moved

Included in 16-page periodical on industrial trucks is a feature article showing how the Philadelphia Bulletin moves more than 1.5 million lb of paper a day. Other articles deal with warehousing, truck dumping, other industrial truck problems.

"Lever" for Winter, 1956, is issued by Lewis-Shepard Products, Inc., Dept. CP, 193 Walnut St., Watertown, Mass. When inquiring specify 7244 on form opposite last page.

Applications of perfume oils presented in pocket-size trio

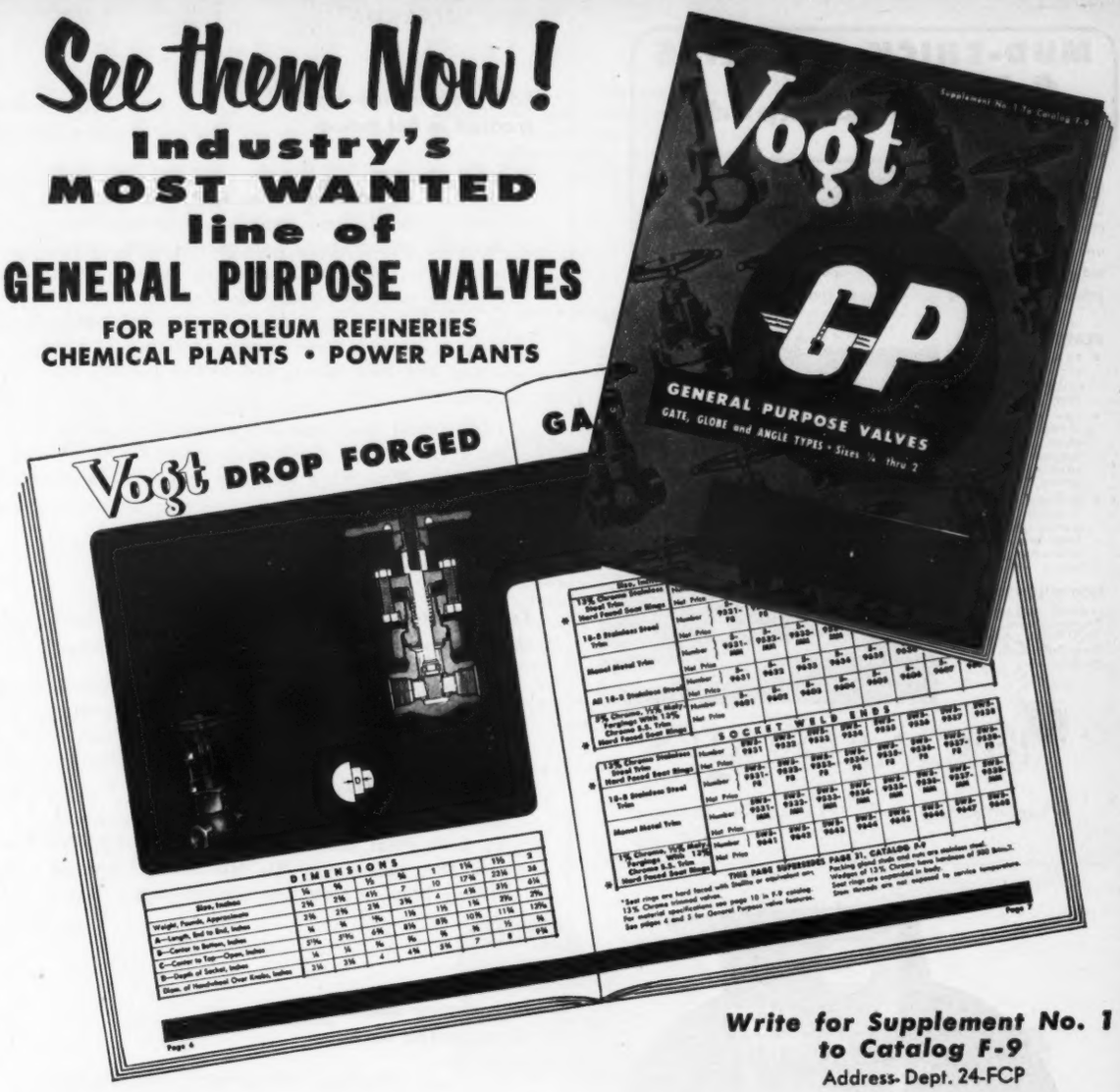
Applications of manufacturer's perfume oils in aerosol, shampoo, and shaving cream industries is presented in trio of pocket-size folders. Individual oils recommended for specific applications are listed together with prices.

Perfume oil booklets are issued by Rhodia, Inc., Dept. CP, 230 Park Ave., New York 17, N. Y. Specify 7245 on form opposite last page.

See them Now!

Industry's MOST WANTED line of GENERAL PURPOSE VALVES

FOR PETROLEUM REFINERIES
CHEMICAL PLANTS • POWER PLANTS



Write for Supplement No. 1 to Catalog F-9
Address- Dept. 24-FCP

MOST WANTED — that's right — because the G P line includes gate, globe, and angle type valves having seats faced with **HAYNES STELLITE*** alloy or other hard facing alloys for greater seat-wear resistance . . . at no extra cost!

Hard faced seats, in combination with precision finished, selectively hardened discs and wedges give these valves amazing resistance to erosion, corrosion and galling. That's why they are setting new standards of performance in steam, water, oil, or gas services at the recommended pressures and temperatures.

Get longer, drop-tight, service life with minimum maintenance by specifying Vogt G P Valves. Available in a complete range of sizes from 1/4" to 2" and rated 800 pounds at 850°F. and 2000 pounds at 100°F.

HENRY VOGT MACHINE CO.
P. O. Box 1918—Louisville 1, Ky.
SALES OFFICES: New York, Chicago, Cleveland, Dallas, Philadelphia, St. Louis, Charleston, W. Va., Cincinnati, San Francisco

Vogt — GENERAL GP PURPOSE — Vogt FOR BETTER VALVES

DROP FORGED STEEL
VALVES

*Trade-Mark of Union Carbide and Carbon Corporation

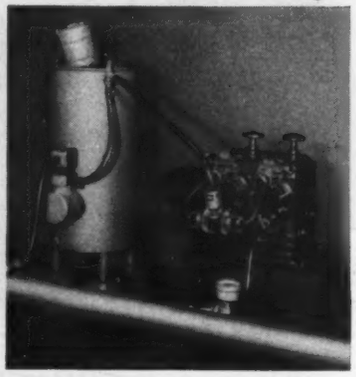
When inquiring check 7246 opposite last page

MUD-THICK SLURRIES CAN be pumped!!

PROPORTIONEERS new Flush Feeder (Pat. applied for) accomplishes the impossible . . . it feeds and proportions slurries of mud-like consistency which are too concentrated for conventional proportioning pumps. For pressures to 1700 psig and capacities from 0.2 to 650 GPH.

FEATURES

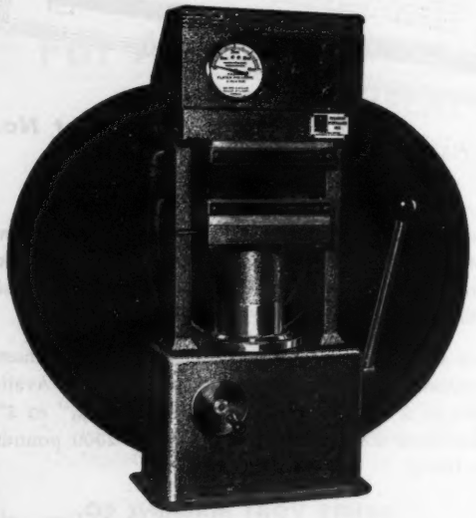
- *Pump abrasion eliminated* — as cylinders handle only clear liquid.
- *Low maintenance* — remote slurry check valves are flushed clean at each discharge stroke.
- *Reduced attention* — small tank of concentrated slurry lasts longer . . . cuts tankage costs, too!



NEW BULLETIN 1310 — available from Proportioneers, Inc., 387 Harris Avenue, Providence 1, R. I. . . . division of

B-I-F INDUSTRIES
PROVIDENCE, RHODE ISLAND
METERS FEEDERS CONTROLS

When inquiring check 7247 opposite last page



If you need a hydraulic bench press for any purpose in the field of rubber moulding, plastic, laboratory testing or graphic arts, write for circular or if you prefer we'll have our nearest representative call on you. . .

PHI PRESS *formerly Preco*

Pasadena Hydraulics, Inc., 275 North Hill Ave., Pasadena, Calif.

When inquiring check 7248 opposite last page

NEW LITERATURE

Eddy-current machinery treated in bul series

Series of seven bulletins describes manufacturer's line of adjustable speed drives, dynamometers, brakes, controls, and stationary field couplings. Bul GB2 presents basic principles of eddy-current machinery. Other literature gives cutaway views detailing individual construction of specific units in complete line of eddy-current rotating equipment. Complete specifications, operating curves, torque and load curves, and control features are presented.

Eddy-current machinery buls are issued by Dynamatic Div., Eaton Manufacturing Co., Dept. CP, Kenosha, Wis. When inquiring specify 7249 on form opposite last page.

Tells of interior pipe and tank coatings

Four-page bulletin carries a number of installation stories showing how two coatings have been used to advantage in controlling corrosion — one in protecting the interior of pipe and the other on the inside of tanks.

Bul on interior pipe and tank coatings is issued by Cook Paint and Varnish Co., Dept. CP, PO Box 389, Kansas City 41, Mo. When inquiring specify 7250 on form opposite last page.

Laboratory applications of activated carbons

Uses and advantages of activated charcoals and carbons in laboratory operations are described in illustrated six-page technical bulletin. Also covered are characteristics of activated charcoal.

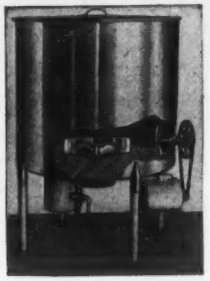
Bul E-1617 is issued by Barnebey-Cheney Co., Dept. CP, Cassady at 8th Ave., Columbus, Ohio. When inquiring specify 7251 on form opposite last page.

Discusses vinyl foams

A formulation that will make vinyl foams with densities between 4 and 30 lb/cu ft is described in 16-page brochure. Use as sheet or slab stock, molded cushions, and direct application during cure are discussed.

"Vinylfoam" is issued by Elastomer Chemical Corp., Dept. CP, 212 Wright St., Newark 5, N.J. When inquiring specify 7252 on form opposite last page.

FILPACO TANKS



Stainless steel storage and mixing tanks of distinction by thoroughly experienced craftsmen.

QUALITY
SERVICE
PRICE

Other Filpaco products:

- filtering materials
- fillers
- filters
- stainless steel smallware
- fittings, tubings
- pumps
- conveyers

FREE ILLUSTRATED LITERATURE

Send for our completely illustrated literature . . . or, if you have a problem involving filter equipment and material, let us work with you.

Your inquiry will receive immediate attention.

FILPACO INDUSTRIES
The FILTER PAPER CO.
2432 S. Michigan Avenue, Chicago 16, Illinois

When inquiring check 7253 opposite last page

Reduce...
MAINTENANCE COSTS WITH
FRANGIBLE DISCS

- *NO FRAGMENTATION . . . Disc ruptures in several similar lobes. Gives unrestricted opening.*
- *HIGH SPEED PROTECTION . . . Sure-fire opening makes FDI discs desirable on all systems, hydraulic or gaseous.*
- *VERSATILITY . . . Use them anywhere in your piping system.*
- *WIDE PROTECTION RANGE . . . Designed to rupture from 5 psi to 5,000 psi . . . higher on special order.*

The Engineered "Safety Factor"

Pressure system protection is no problem with frangible discs. You decide your own replacement schedule . . . slide the retainer ring out, replace the disc and re-install. As simple as that.

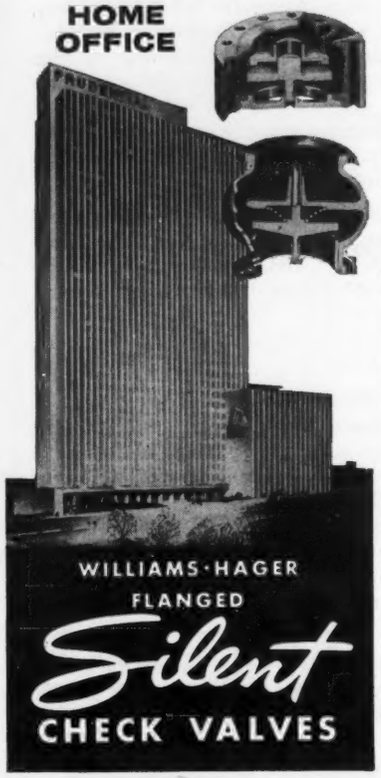
Send For Our Free Catalog Today

Frangible Discs, Inc.
Penns Grove, N. J.

When inquiring check 7254 opposite last page

SAFE, *Silent* PIPING for PRUDENTIAL'S

MID-AMERICA HOME OFFICE



WILLIAMS-HAGER FLANGED *Silent* CHECK VALVES

OTHER REPRESENTATIVE BUILDINGS:

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Standard Oil Building, Chicago, Ill.

Water hammer is effectively controlled by Williams-Hager *Silent* Check Valves. Troublesome noises are eliminated, and piping, pumps and other components are protected from damage.

Write for Bulletins:
No. 654 on the Valves
No. 851 on Cause, Effect and Control of Water Hammer

THE WILLIAMS GAUGE CO., INC.
146 Stanwix Street
2 Gateway Center Pittsburgh 22, Pa.
Our 70th Anniversary • 1886-1956

When inquiring check 7255 opposite last page

Principle of cationic flotation reviewed in 20-page book

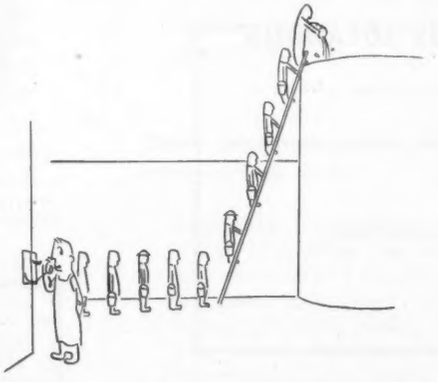
Properties, application and advantages of cationic chemicals in flotation are described in 20-page booklet. Designed to fill need for factual and concise information on the subject, it contains a review of the principle of cationic flotation, chemicals used, conditions needed, and advantages inherent in cationic chemicals. Listing of technical services and literature available on the subject is also given.

"Mineral Flotation with Armour Cationic Chemicals" is issued by Armour and Company, Chemical Division, Dept. CP, 1355 West 31st Street, Chicago 9, Illinois. When inquiring specify CP 7256 on form opposite last page.

Graphically illustrates uses of clay conduit systems

Application of various kinds of clay conduit structures to underground steam, hot water, and process piping installations is graphically illustrated in 20-page brochure. Engineering and specification data for company's line of clay conduit structures are included.

Bul 56 is available from Heat Transmission Conduit Co., Dept. CP, 2300 Payne Ave., Cleveland 14, Ohio. When inquiring specify 7257 on form opposite last page.



"How's the shop doing on that pump?"

H. H. (Mac) McGriff, of Carbide and Carbon Chemicals Company, South Charleston, W. Va., is responsible for the idea used in this cartoon.

STAYS TOUGH AT SUB-ZERO TEMPERATURES

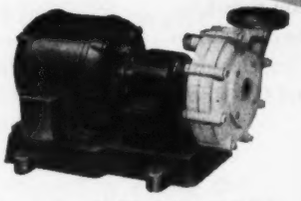
ACE PARIAN . . . odorless, tasteless, rigid polyethylene. Best chemical resistance of any plastic at room temp. except to acetic acid. Excellent impact strength at sub-zero temp. Rigid pipe ½" to 2". *Bul. 351.*

LIFE-TIME ACID STORAGE TANKS
Rubber-lined by ACE 2-layer system

Economical, universal protection against all alkalis, metallic salts, practically all inorganic acids, hydrochloric acid any strength, sulphuric to 50%, nitric to 20%, phosphoric to 75%. Good to 160 deg. F. . . . sometimes higher. Soft rubber interlayer aids shock resistance.

Now eleven ACE Materials to STOP CORROSION

Eleven job-proved rubber and plastic materials now available in ACE piping, valves, pumps and tanks. Tough Ace-lite rubber-plastic blend . . . Saran . . . heat-resistant Tempron . . . Rivicor PVC . . . many others. Write for comparative properties Bulletin CE-50 . . . or call your American Hard Rubber Company distributor.



ACE "WAM" . . . THE FINEST *Non-metallic Acid Pump*

On job after job, this 80-gpm. centrifugal pump has earned highest praise. Hard rubber casing and impeller, Hastelloy C shaft. Handles nearly all corrosives. Mechanically simple, trouble-free. *Bulletin CE-55.* Larger ACE pumps available.

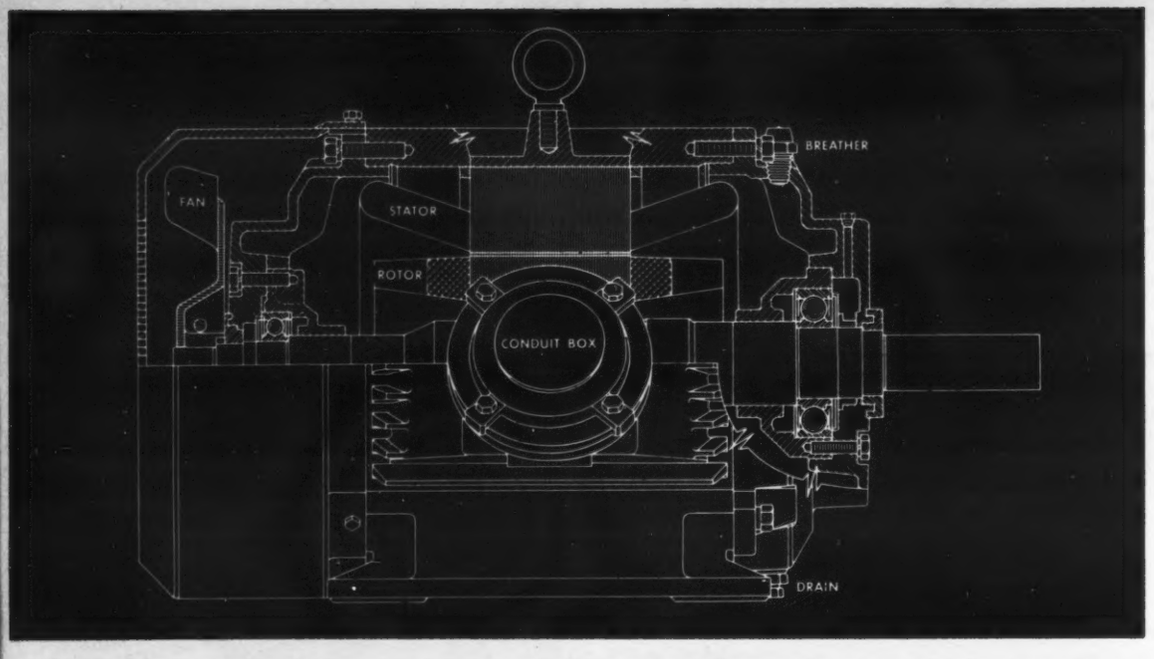
NEED SPECIAL FITTINGS, COVERS, TANKS, PARTS?

If you want life-time corrosion protection for special parts needed in quantity . . . we may save for you by molding them of ACE hard rubber or plastics to your most exacting requirements. Our facilities among world's largest. Ask for recommendations.

ACE processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
93 WORTH STREET • NEW YORK 13, N. Y.

When inquiring check 7258 opposite last page



THIS MOTOR CAN CUT YOUR HAZARDOUS ATMOSPHERE INSURANCE COST

Insuring facilities with electric motors in hazardous atmospheres is generally expensive or impossible without special motors. Reliance has developed a completely new, Underwriters' approved motor design, called explosion-proof, for hazardous locations. In fact this is the only motor design that meets all qualifications for classes I, group D and class II, groups E, F and G without requiring modification.

This new motor incorporates all of the outstanding features of the standard Reliance Totally-Protected Motor. In addition, all Reliance Explosion-Proof Motors are built to corrosion-proof standards.

If you would like to have more information on what qualifies a motor for hazardous atmospheres, write for our new Explosion-Proof Motor Bulletin No. B-2409. B-1526

NATIONAL ELECTRICAL CODE CLASSES OF HAZARDOUS LOCATIONS

CLASS I—Those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

Group D—Atmospheres containing gasoline, hexane, naphtha, benzine, butane, propane, alcohols, acetone, benzol, lacquer solvent vapors, or natural gas.

CLASS II—Those which are hazardous because of the presence of combustible dust.

Group E—Atmospheres containing dust of aluminum, magnesium, or their commercial alloys.

Group F—Atmospheres containing carbon black, coal or coke dust.

Group G—Atmospheres containing flour, starch or grain dust.

RELIANCE Totally-Protected MOTORS

RELIANCE ELECTRIC AND ENGINEERING CO.

DEPT. 148A, CLEVELAND 10, OHIO • CANADIAN DIVISION: WELLAND, ONTARIO

Sales Offices and Distributors in Principal Cities

When inquiring check 7259 opposite last page

NEW LITERATURE

Cutaways show construction of pumps and seals

Series of bulletins describe manufacturer's pumps and mechanical seal. Bul 184 deals with standard centrifugal process pumps for industrial, refinery, and general service. Bul 189 discusses manufacturer's mechanical stuffing box sealing for high temperature service. Standard centrifugal pumps for general and chemical service are subject of Bul 190. Cutaway views, installation photographs, and head-capacity range charts are used to illustrate construction features.

Buls 184, 189, and 190 are available from Dean Brothers Pumps Inc., Dept. CP, 323 W. Tenth St., Indianapolis 7, Ind. When inquiring specify 7260 on form opposite last page.

Workings of sludge collector treated in bulletin

Flight collectors for rectangular settling basins are thoroughly covered in 20-page engineering bulletin. Design data, detailed descriptions, specifications, photographs, and drawings are included. Supplementary equipment such as cross collectors, skimmers, and sludge draw-off valves are also described.

Bul 8W68 is issued by Walker Process Equipment Inc., Dept. CP, Aurora, Ill. When inquiring specify 7261 on form opposite last page.

Reviews entire truck line for plant use

Four-page folder shows complete line of industrial trucks. Fully-illustrated, it describes each of 42 trucks and attachments as well as cranes, working height lifters, and trailers.

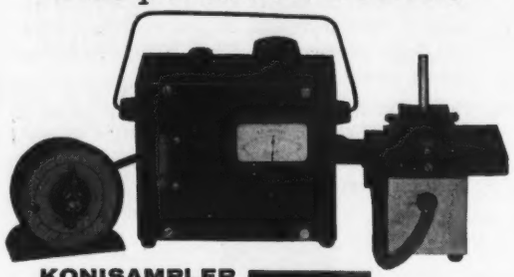
Circular 80-203 is issued by Dept. R-10, Lewis-Shepard Products, Inc., Dept. CP, 193 Walnut St., Watertown, Mass. When inquiring specify 7262 on form opposite last page.

you are reading **chemical processing** For Men who Manage

. . . because you are responsible for some phase of processing in your company. The Editors explain how you and other "men who manage" these operations are selected to receive the magazine regularly.

. . . see page 122.

For continuous, and accurate
DUST SAMPLING
with permanent records



KONISAMPLER
(pat. pend.)

Employs principle of thermal precipitation. Light weight — quiet — all electric Automatic timer — will also operate continuously — secures particulate matter suitable for microscopic, electron microscopic or visual and for permanent records on standard glass slides.

Cost (complete) with carrying case $225.00

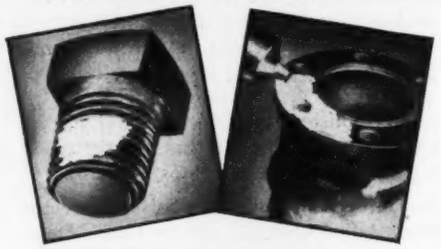
Send for descriptive literature K-1

Designer and manufacturer of continuous gravimetric and oscillating types of thermal precipitators

JOSEPH B. FICKLEN III
1848 East Mountain St.
Pasadena 7, California

When inquiring check 7263 opposite last page

THE ANSWER TO THOSE DIFFICULT LEAKING-JOINT PROBLEMS!



The tough, clinging film of Leak Lock stretches rather than breaks

Leak Lock has the ability to hold chemical solutions and gases that would eat through ordinary joint compounds. It has extraordinary adhesion and remains flexible indefinitely.

During the past six years, Leak Lock has found its place in the chemical, petroleum, atomic energy, electronic, refrigeration and many other industries in constantly increasing uses for special purposes and as the answer to many "unsolvable" joint problems.

If you have a leaking joint problem, send for information and a sample of Leak Lock. Stewart Industries, Inc., 16 Colfax Avenue, Clifton, N. J.

Leak Lock

When inquiring check 7264 opposite last page

What's all this about Hypalon?

Hypalon synthetic rubber is chlorosulfonated polyethylene. By combining it with properly selected compounding ingredients, products that can be molded, extruded, or calendered can be made, as well as protective coatings. The products, however, are resistant to heat, weather, ozone, and chemicals. This 8-page booklet gives all the details.

"Hypalon" is issued by Elastomers Div., E.I. duPont de Nemours & Co. (Inc.), Wilmington 98, Del. When inquiring specify 7265 on form opposite last page.

Liquid-metering systems pictured

Animated drawings are used to illustrate company's automatic metering systems for batching light or heavy liquids. All-jacketed direct control, typical remote control, dual valve, and multi-valve systems are covered. Photographs show installations and illustrate system components.

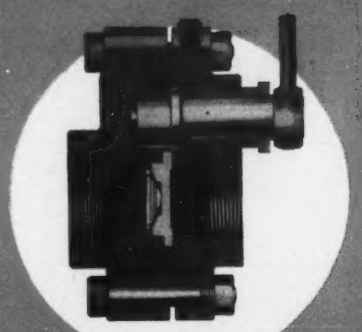
Bul FL-56 is available from Hetherington & Berner Inc., Dept. CP, 701-745 Kentucky Ave., Indianapolis 7, Ind. When inquiring specify 7266 on form opposite last page.

Gives engineering info on reversing motors

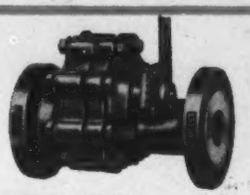
Engineering information, consisting of formulas for inertia and motor reversal calculations, is included in four-page bulletin on rapid-reversing motors. Cutaway view shows construction of blower-cooled unit capable of more than 200 idle reversals per minute.

Bul 1800 is issued by The Louis Allis Co., Dept. CP, Lou and Skid Sts., Milwaukee 7, Wis. When inquiring specify 7267 on form opp. last page.

Everlasting **Valves**
are superior for many services

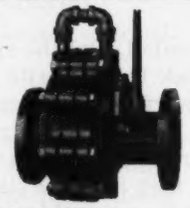


BOILER BLOW-OFF
Quick acting, also handwheel operated "Y" and angle types. For pressures up to 600 psi.



GENERAL SERVICE
Where drop-tight seal and full flow is essential.

CYLINDER OPERATED
Can be remotely controlled, electrically or manually.



STEAM JACKETED
Assures free flow of viscous materials.

WEIGHT-OPERATED
For automatic drains or emergency shut off.

When you want

- quick action
- drop-tight seal
- minimum pressure drop
- straight-through full flow
- self-grinding rotating disc
- valves that cannot wedge or jam

then you want an Everlasting Valve

No other valve has all the Everlasting features . . . proven by half a century of service to assure dependable, leak-tight service.

LET US HELP YOU WITH YOUR VALVE PROBLEMS

EVERLASTING *Valves*

EVERLASTING VALVE CO.
73 FISK STREET, JERSEY CITY 5, N. J.

EV-208

When inquiring check 7268 opposite last page

The symbol, and the spirit, of the fighting gamecock lives on with the commissioning of the powerful aircraft carrier, *USS Saratoga.*

The incident which gave birth to this 142 year old Navy tradition took place on the decks of the first *Saratoga* as she closed for action against four men-o'-war in 1812. In the opening minutes of the engagement an enemy ball landed on deck – crashing into a coop containing a gamecock brought aboard by a sailor.

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NEW LITERATURE

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Performance curves, dimensional drawings, and general descriptions are used to outline performance of company's line of seal-less (Bul 1030) and high temperature (Bul 1040) centrifugal canned motor pumps.

Buls 1030 and 1040 are available from Station K, Chempump Corp., Dept. CP, 1300 E. Mermaid Lane, Philadelphia 18, Pa. When inquiring specify 7270 on form opposite last page.

Describes hot-applied insulation that is lightweight

Thermo-plastic-bound volcanic glass, a lightweight insulating concrete fill, is described in detail in illustrated catalog of eight pages. Advantages, U factors, and specifications for monolithic compound are presented.

Cat F59 is available from Silbrico Corp., Dept. CP, 5901 W. 66th St., Chicago 38, Ill. When inquiring specify 7271 on form opposite last page.

Properties, compatibilities, uses of low-mw polyethylenes

Low molecular weight polyethylenes that are used as ingredients in combination with waxes or film-forming materials are the subject of 14-page mimeographed brochure. The features which make them attractive for use in coating paper, polishes, candles, electrical insulations, and rubber are brought out. Properties of the eight A-C grades and compatibilities are given.

Bul 116 is issued by Semet-Solvay Petrochemical Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N. Y. When inquiring specify 7272 on form opposite last page.

Latest data on fire-resistant curing agent for epoxies

Het Anhydride®, a chlorine-containing dibasic anhydride which is used as a hardener for epoxy resins; in paints, varnishes, and resins; and as a chemical intermediate, is subject of 21-page monograph. Reactions, uses, preparations, and properties are given. Recent data in high-temp flex properties and heat aging are included.

Bul No. 43 is issued by Hooker Electrochemical Co., Dept. CP, PO Box 344, Niagara Falls, N.Y. Specify 7273 opposite last page.

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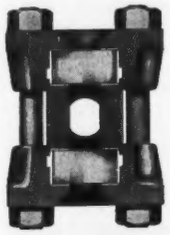

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Take the Long View

(*Continued from page 7*)

tal per sales dollar. These plans typically consist of a listing of new projects for which capital requirements have been estimated in varying degrees of certainty, a timetable indicating when the funds likely will be needed, and an indication of where the funds will be obtained.

Another field where planning can pay substantial dividends is sales. Here it might prove worthwhile to develop plans at two levels — a detailed plan for each product group and an over-all plan for the company or division.

At the product level, thought will be given to such things as major sales strategies, pricing, your portion of industry sales, advertising and promotion plans and manpower requirements. At the company level, attention must be directed toward company goals and objectives in view of basic economic and technological trends. It can clearly indicate major areas of emphasis and de-emphasis, and fields of interest upon which future growth is based.

Long-range thinking in the personnel field does not seem to be as common as financial or sales planning, but it is becoming increasingly important. There is an acute shortage of manpower in the just-out-of-school bracket — particularly of technical personnel. Not only are there few young technical men coming out of colleges, but fewer youngsters now in school are taking technical courses. It is reported that just one firm alone would have liked to take ten per cent of *all* graduates in this year's engineering class if it could have signed them. And this shortage will continue, at least until 1960. The situation is demanding that we look to our future needs more than ever before.

Research, in itself, is long-range planning. But the number of successes you turn up depends largely on how accurately you have estimated future markets, how well you have determined your own strengths and weaknesses and acted on that analysis, and how accurately you have estimated the future needs for research funds.

Long-range planning for production is important in determining needs for new or expanded facilities, but it can also be greatly rewarding in the area of establishing programs directed toward reducing costs and developing process or product improvements.

However, there are some booby-traps to look for when building your planning program. Of great importance . . . don't take someone else's plan for your own use without fitting it to your own particular circumstances. Evaluate what is and isn't important . . . and emphasize those areas that are of greatest concern to you. In your look into the future, you may conclude that sales will be the most important factor and the biggest problem for the next several years. In that case, make sure your sales-planning

(*Please turn to next page*)

Hardinge 9′ x 22′ Pebble Tube Mill in an Ohio plant producing silica flour.

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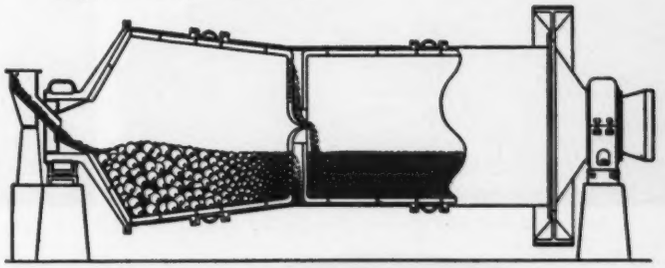

Tricone compartment Tube Mill with grate and lifters.

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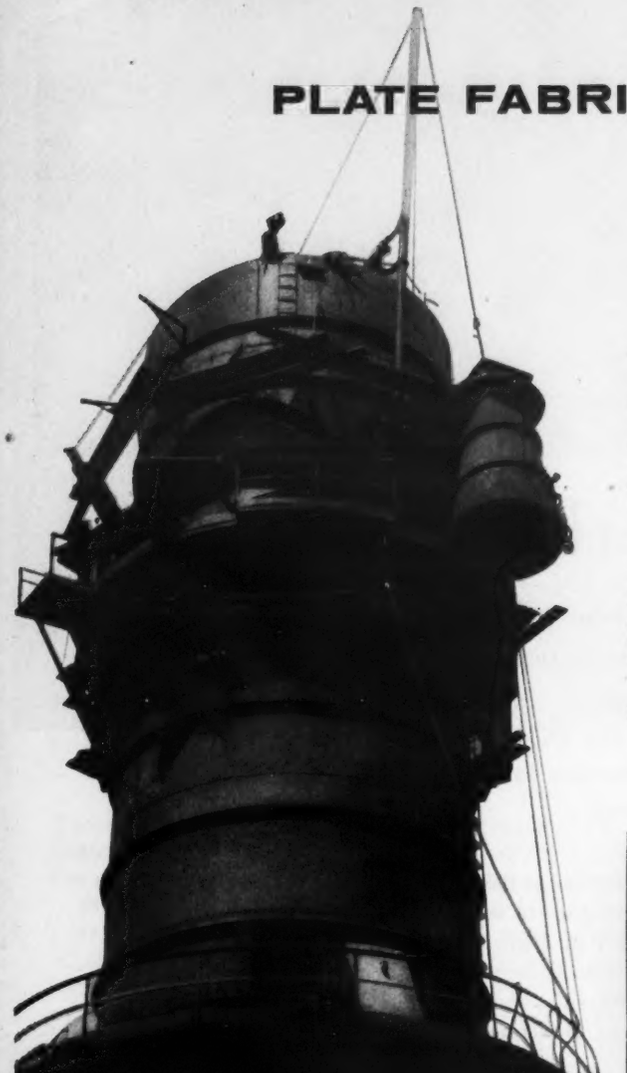
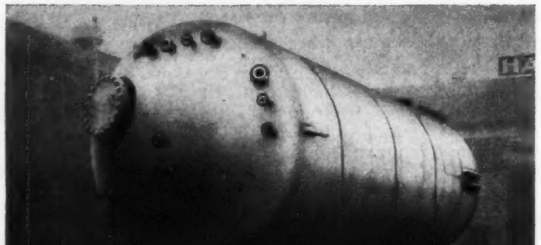


*Spray Tower, fabricated and erected by Hammond Iron Works. Diameter: 20'—Height 60'. Exterior of flanged type carbon steel. Interior, **stainless-clad.***



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Take the Long View

(*Continued from preceding page*)

house is in order before venturing into other fields. Or you may be in a growth situation where financial and personnel problems are the major concern. Should that be the case, these points should get first attention.

And select very carefully the range for which planning is most needed and practical. Why five, or eight, or ten years? Tremendous amounts of time can be saved and the program made more effective if the time period for planning is thoughtfully selected to satisfy your own circumstances.

But don't get too fancy too quickly. Develop your approach slowly. Start by first examining your short-range planning. If this is not well done there is little point in going on to broader fields of thinking.

And make certain that all of the forecasting, fact gathering, and analysis work develops into a *specific program of action*. In the past I have observed that some groups do a most thorough evaluation of the future and a first-rate analysis of their current strengths, weaknesses, and position in the industry — and then stop there. If specific action programs are not the culmination of all this work, the whole process is of questionable value.

✦ ✦ ✦

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THE EDITORS

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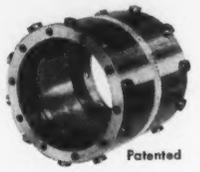

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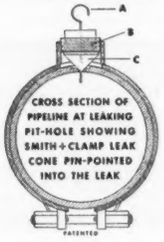

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Use this "quick-locator" when you want information on a specific type of process, equipment or material mentioned in the processing stories or the advertisements in this magazine. Everything discussed in this issue is given here, if you want more data you can write manufacturer direct . . . or turn to inside back cover and use the convenient "Information Request Slip." This is a special service provided by the publisher . . . no obligation or charge, of course. The publisher contacts the proper manufacturers for you—information comes to you direct.

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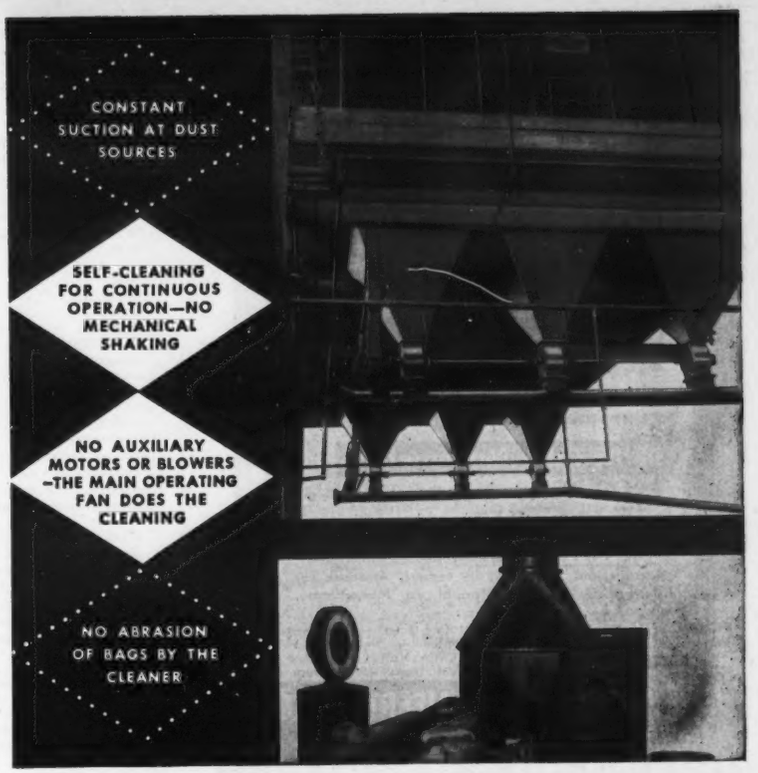
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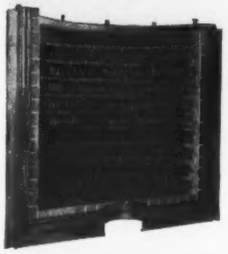

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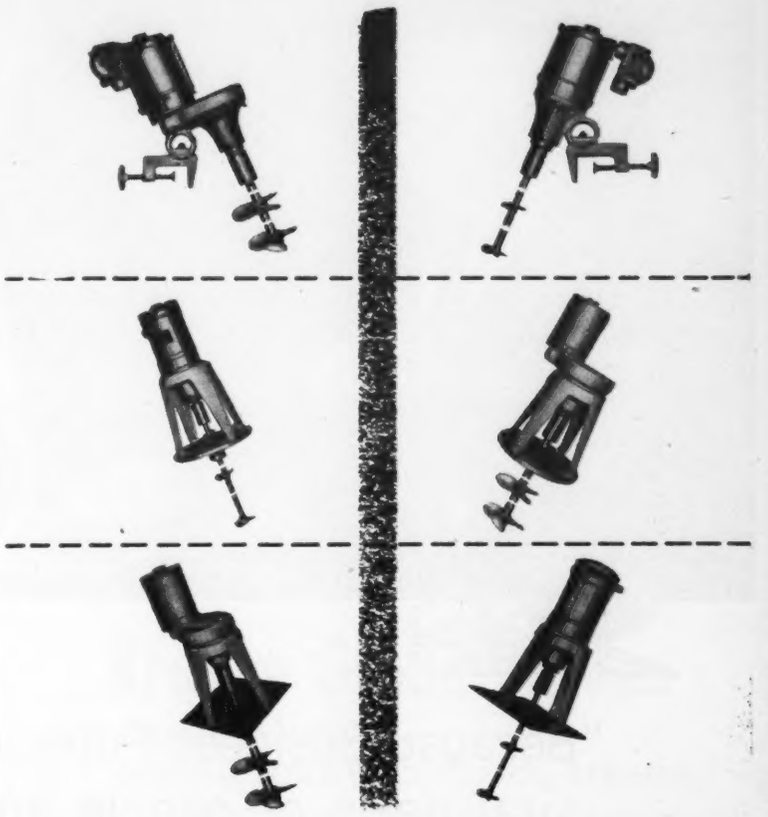

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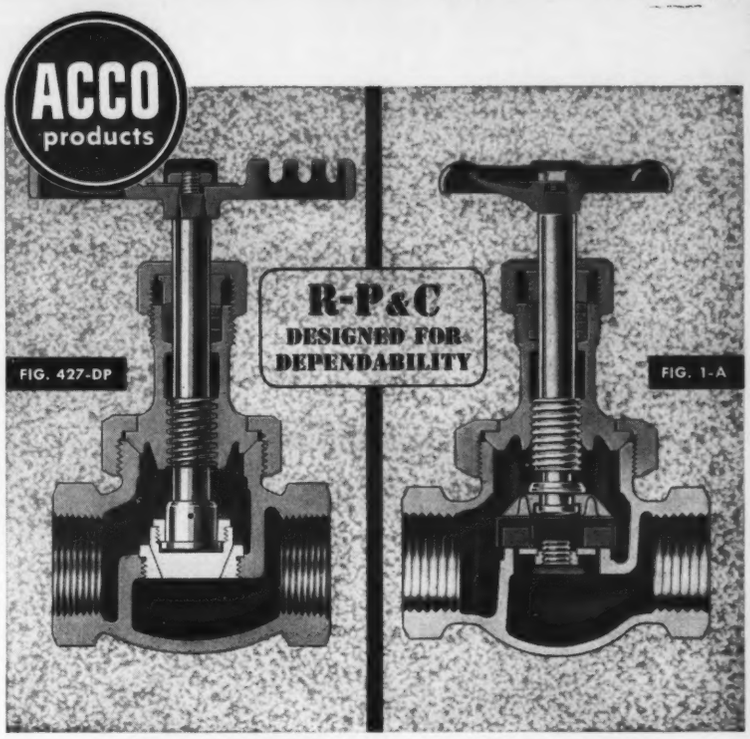

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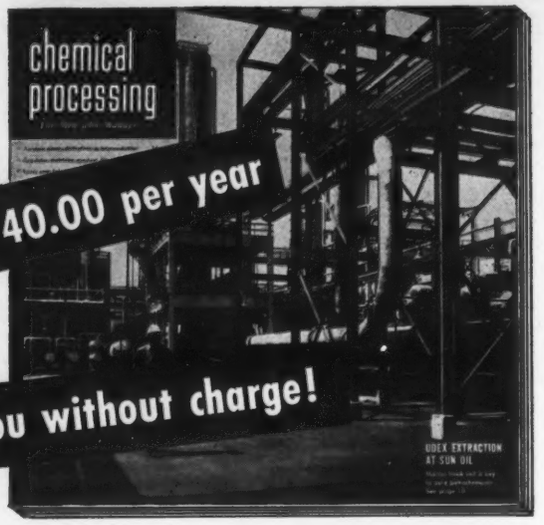

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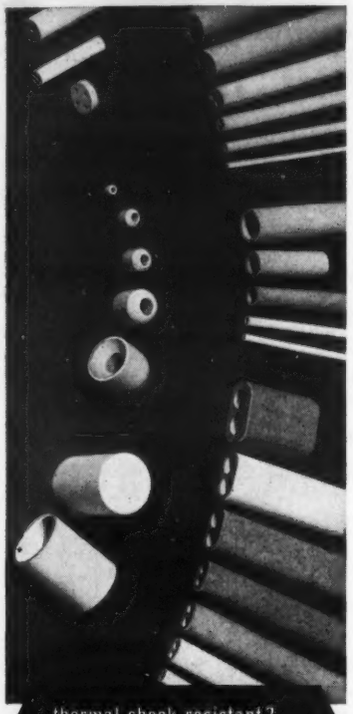

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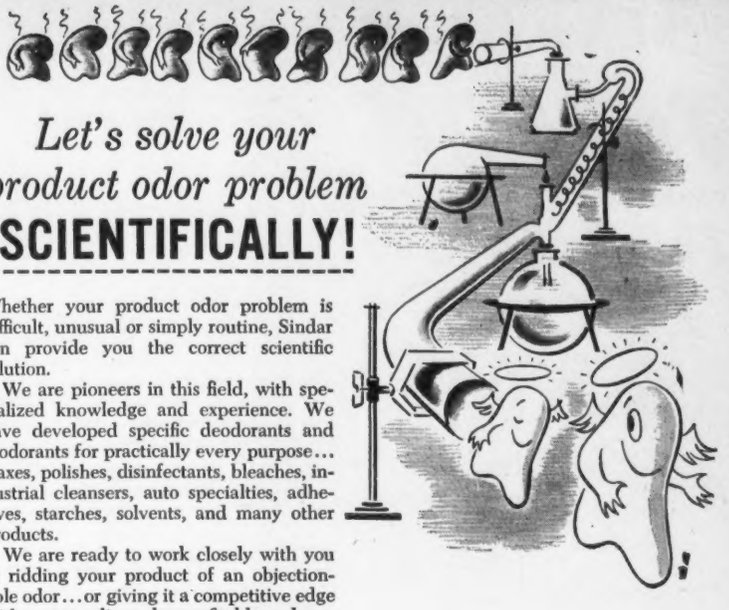

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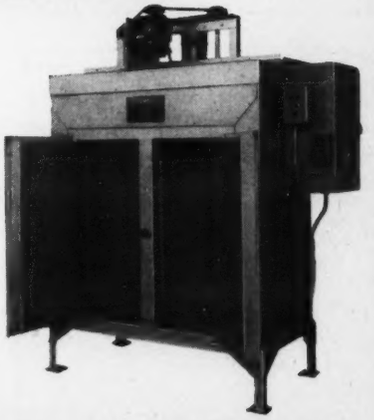

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☐ 6846
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☐ 6849a
☐ 6849b
☐ 6849c
☐ 6849d
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☐ 6851
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☐ 6854
☐ 6855a

☐ 6855b

If you want more information on processes, controls or developments of products discussed herein, as you read this issue, ask our READER SERVICE DEPT. . . . use this sheet

READER SERVICE SLIP
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As you read editorial articles and advertisements which interest you, on which you'd like more information, note key number under each. Check back to this sheet, verify the key number by name of product discussed, check space provided. Fill in your name, title, company, main product and address on reverse side of this sheet and mail to publisher's Reader Service Dept. Information will come to you direct, without obligation.

✓	Key	Description
☐	6812	Cuprous Chloride
☐	6813	Dry-blending Resin
☐	6814	Phenol
☐	6815	Snubbers
☐	6816a	Centrifugal Filter
☐	6816b	Rotary Vacuum Filter
☐	6816c	Suspended Centrifugal
☐	6816d	Pressure Filter
☐	6816e	Centrifugal Dryer
☐	6816f	Vacuum Filter
☐	6817	Plastic Pelletizer
☐	6818a	Pulverizers
☐	6818b	Collectors
☐	6819	Conveyors
☐	6820	Packaged Boiler
☐	6821	Heat-resistant Alloy
☐	6822	Radiant Heaters
☐	6823	Gyratory Screen
☐	6824	Liquid Oxygen Pump
☐	6825	Ultrasonic Mills
☐	6826	Magnetic Separators
☐	6827	Asbestos Cement Pipe
☐	6828	Impulse Steam Trap
☐	6829	Heat Exchanger
☐	6830a	Coconut Oil
☐	6830b	Fatty Acids
☐	6830c	Methyl Esters
☐	6830d	Capric Acid
☐	6831a	Antifoam A
☐	6831b	Antifoam AF Emulsion
☐	6832	Mobile Elevator
☐	6833	Cupro-nickel Tubes
☐	6834	Teflon Mechanical Seal
☐	6835a	Stainless Fittings
☐	6835b	Flange Slide Rule
☐	6836	Submerged Combustion
☐	6837	Amorphous Elemental Boron
☐	6838	Roller Mills
☐	6839	Carbide Cutter Bits
☐	6840	Pressure-reduction Silencers
☐	6841a	Dissolvers
☐	6841b	Mills
☐	6842	Variable Speed Drive
☐	6843	Cartridge-type Thermostats
☐	6844	Vibrating-screen Separators
☐	6845	Aluminum Pipe, Fittings & Flanges
☐	6846	Water Filter
☐	6847	Diisocyanates
☐	6848	Propionic Acid
☐	6849a	Acetic Acid
☐	6849b	Acetic Anhydride
☐	6849c	Propionic Acid
☐	6849d	n-Butyric Acid
☐	6849e	n-Butyric Anhydride
☐	6849f	Isobutyric Acid
☐	6849g	Isobutyric Anhydride
☐	6849h	2-Ethyl Hexoic Acid
☐	6850	Tooling Resins
☐	6851	GR-S in Non-black Goods
☐	6852	Wood Preservation Process
☐	6853	Chemical Formulas
☐	6854	Ethylene Oxide
☐	6855a	Fatty Acids & Fatty Derivatives
☐	6855b	Pressed Stearic Acid
☐	6855c	Coco Acid
☐	6855d	Palmitics & Stearic Acid
☐	6855e	Oleic Acids
☐	6856	Resin for Finishes
☐	6857	Glass Making
☐	6858	Filter Aids
☐	6859	Polyglycols
☐	6860	Textile Chemicals
☐	6861	Filter Aids
☐	6862	Polyurethane Stripper
☐	6863	Formaldehyde
☐	6864	Silicone Rubber
☐	6865	Light Weight Aggregates
☐	6866	Triallyl Citrate
☐	6867	Code 91 Hydrogel
☐	6868	Solvents Recovery
☐	6869	Fillers & Pigments
☐	6870	Expanded Polystyrene
☐	6871	Rigid Vinyl for Piping
☐	6872a	Activated Carbons
☐	6872b	Polyester Resins
☐	6872c	Spotting Agents
☐	6873	Cyclohexyl Stearate & Oleate
☐	6874	Histamine (2-ring-C14) Dihydrochloride
☐	6875	Acrylic Thickeners
☐	6876	Chromium Oxides
☐	6877	Dehydroacetic Acid
☐	6878a	Propargyl Alcohol
☐	6878b	Propargyl Bromide
☐	6879	Tetrahydrofurfuryl Alcohol
☐	6880	Chromium Compounds
☐	6881	Granular Pyrophyllite
☐	6882	Organic Chemicals
☐	6883	Polyvinyl Alcohols
☐	6884	Biologically-stable Casein
☐	6885	Synthetic Egg Yolk
☐	6886	Vinyl Resin
☐	6887	Butyl Rubber
☐	6888	Anion Exchange Resins
☐	6889	Pelleted Zinc Oxide
☐	6890	Catalysts for Silicone Rubber
☐	6891a	Adhesive
☐	6891b	Paint & Varnish
☐	6891c	Paper & Fibre Board
☐	6892	Solvents
☐	6893	Hydroxylammonium Sulfate
☐	6894	Surface Chemistry
☐	6895	Greenish-black Dye
☐	6896	Ethylene Imine
☐	6897a	Polyethylene Resin
☐	6897b	Teflon Resin
☐	6898	Granular Carbon
☐	6899	Nitrile Rubber Cements
☐	6900	Epoxy Pastes
☐	6901	Secondary Plasticizer
☐	6902	Silicone Lubricant
☐	6903	Malic Acid
☐	6904a	Benzene
☐	6904b	Toluene
☐	6904c	Mixed Xylenes
☐	6904d	Propylene Tetramer
☐	6904e	Sunaptic Acids
☐	6904f	PDO-40
☐	6904g	Sulfonate WS
☐	6904h	Sulfur
☐	6904i	Anhydrous Ammonia
☐	6905	Silicone Mold Release
☐	6906	Rubber Anti-oxidant
☐	6907	Malononitrile
☐	6908	Diethylaminoethanethiol HCl
☐	6909a	Zirconium
☐	6909b	Nitrofurans
☐	6909c	Hansa Yellow
☐	6909d	Urethan
☐	6909e	Technical Developments (give number)
☐	6910a	Insecticides
☐	6910b	Cellulose Acetate
☐	6910c	Chlorinated Rubber
☐	6911	Pelargonic Acid
☐	6912	Vinyl Stabilizers
☐	6913	Polyethylene Waxes
☐	6914	Polyethylene Packaging for Cosmetics
☐	6915	Deacetylated Chitin
☐	6916a	Caustic Soda
☐	6916b	Inert Lubricants
☐	6916c	Caustic Potash
☐	6916d	Carbonate of Potash
☐	6916e	Fluorolube Oils and Greases
☐	6916f	Other Chemicals (see coupon, state which)
☐	6917a	Hydrogen Peroxide (see ad, state bulletin)
☐	6917b	Persulfates (see ad, state bulletin)
☐	6917c	Sodium Perborate (see ad, state bulletin)
☐	6917d	Peracetic Acid (see ad, state bulletin)
☐	6917e	Peroxygen Compounds (see ad, state bulletin)
☐	6917f	Textile Bleaching (see ad, state bulletin)
☐	6917g	Pulp Bleaching (see ad, state bulletin)
☐	6918	Dust Collector
☐	6919	Fused Silica Windows
☐	6920	Waste Liquor Recovery
☐	6921	Plastics in Foundries
☐	6922	Stainless Steel Processing Equipment
☐	6923	Bronze Gate Valve
☐	6924	Water Treatment
☐	6925	Stainless Nickel Steel
☐	6926	Rice Oil Refining
☐	6927	Filmstrip Series
☐	6928	Steam Traps
☐	6929	Compressors
☐	6930	Chemical-drying Process
☐	6931	Soviet Atomic Journal
☐	6932a	Corrosion Engineering
☐	6932b	Buyer's Guide
☐	6933	Filters (state problem)
☐	6934a	String Filter
☐	6934b	Horizontal Filter
☐	6934c	Scraper Filter
☐	6935	Pilot Plant
☐	6936	Finned Condenser Tube
☐	6937	Filter Fabrics
☐	6938	Heat Exchanger
☐	6939	Liquid-metal Pump
☐	6940	Vermiculite
☐	6941	Mechanical Rectifier
☐	6942	Opportunities in Chemicals
☐	6943	Rib-type Motor
☐	6944	Liquid Meter
☐	6945	Rotameters
☐	6946	Process Timing Controller
☐	6947	Temperature Regulator
☐	6948	Water Vapor Detectors
☐	6949	Tachometer Heads
☐	6950	Control System
☐	6951a	pH System Analysis Form
☐	6951b	Industrial pH Measurement & Control
☐	6952	Thermocouple Monitors
☐	6953	Viscosity Controller
☐	6954	Instrument Cabinets
☐	6955	Control Valve
☐	6956	Displacement Meter
☐	6957	Tank Level Controls
☐	6958	Refractometers
☐	6959	Spectrographic Analyzers
☐	6960	Data Computers
☐	6961a	Pressure Controller
☐	6961b	Flow Transmitter
☐	6962	Infrared Analyzer
☐	6963	Batching System
☐	6964	Gages
☐	6965	Valve Positioner
☐	6966	DC Amplifiers
☐	6967	Pneumatic Transmitters
☐	6968	Flow Indicators
☐	6969a	"Controlled Volume Pumps in Paper Making"
☐	6969b	"Controlled Volume Pumps in Industrial Water Treating"
☐	6969c	"Controlled Volume Pumps in Process Instrumentation"
☐	6970	Flow Meters
☐	6971	Flow Alarms
☐	6972	Electrical Timers
☐	6973a	Recorders
☐	6973b	Controllers
☐	6973c	Indicators
☐	6974a	Control Relay
☐	6974b	Receiver
☐	6974c	Selector Station
☐	6974d	Transmitter
☐	6974e	Power Unit
☐	6975	Pressure Regulators
☐	6976	Refractometers
☐	6977	Batching Controller
☐	6978	Corrosion Meters
☐	6979	Packing Gland
☐	6980	Stainless Tank
☐	6981	Glass Piping
☐	6982a	Polyvinyl Formal Resin
☐	6982b	Wash Primer
☐	6982c	Butyral Resin
☐	6983	Protective Coatings
☐	6984	Glassed-steel Reactor
☐	6985	Corrosion-resistant Coating
☐	6986	Stainless Heat Exchanger
☐	6987	Stainless Steel Pump
☐	6988	Flexible Plastic Tube
☐	6989	Piston Packing
☐	6990	Cementable Teflon
☐	6991	Nickel Tubing
☐	6992a	Stainless Fitting
☐	6992b	Compression Valve
☐	6992c	Plug Valve
☐	6992d	Pump
☐	6992e	Tube
☐	6993	Protective Coatings
☐	6994	Plastisol Coating
☐	6995	Fume Hood
☐	6996	Rubber-lined Fume Exhauster
☐	6997	Centrifugal Pump
☐	6998	Wire Cloth, Screens, Strainers & Filters
☐	6999	Glass-lined Pipe & Valves
☐	7000a	Rigid Koroseal Pipe
☐	7000b	Rigid Koroseal Sheet
☐	7001	Tantalum
☐	7002	Insulating Pipe Coating
☐	7003	Pipe Compound
☐	7004	Porcelain Jars, Pots, Crocks, Tanks
☐	7005	Glass Shell and Tube Heat Exchanger
☐	7006	Glassed-steel Turbogrid Tray
☐	7007	Liquid Neoprene Coating
☐	7008	Alloy Monel
☐	7009	Teflon Hose
☐	7010	Chemical Packing
☐	7011	Solenoid Valve
☐	7012	Corrosion-resistant Vessel
☐	7013	Corrosion Proof Mortar
☐	7014	Corrosion-resistant Products
☐	7015	Self-priming Centrifugal Pump
☐	7016	Stainless & Monel Utensils
☐	7017	Bin Level Indicator
☐	7018	Natural-frequency Conveyor
☐	7019	Tractor Shovel
☐	7020	Paper Roll Handling
☐	7021	Gas Fork Lift Trucks (state which)
☐	7022	Elevator
☐	7023	Pneumatic & Electric Vibrators
☐	7024	Carloader Belt
☐	7025	Belt Conveyor Equipment
☐	7026a	Gravity & Power Conveyor
☐	7026b	Spiral Chute
☐	7026c	Pneumatic Tube System
☐	7027	Portable Radios
☐	7028	Liquid-level Controls
☐	7029	Industrial Pump
☐	7030	Side-loading Truck
☐	7031	Tractor-shovel (state model)
☐	7032	Conveyor
☐	7033	Fork-lift Truck
☐	7034	Feeders
☐	7035	Shaft-mounted Drive
☐	7036	Slurry Pump
☐	7037	Casters & Wheels
☐	7038	Car Repair
☐	7039	Walkie Truck
☐	7040	Fork Lift Truck
☐	7041	Lift Trucks
☐	7042	Concrete Storage Bin
☐	7043	Conveyor

Be Sure To Give Your Address

See additional products and services on reverse side——→

READER SERVICE SLIP

(Continued from reverse side of this sheet).

AUGUST 1956

For more information on processes, controls or developments of products . . . note key number of staff-written editorial articles and advertisements that interest you . . . verify the key on this sheet . . . check space provided . . . fill in your name, title, company, main product and address below . . . mail to publisher's Reader Service Dept.

Be Sure To Give Your Address

✓	Key	Description
☐	7044	Truck Cost
☐	7045a	Tubular Conveyor
☐	7045b	Bucket Elevator
☐	7046	Fiberglass Tray
☐	7047	Investment Survey
☐	7048	Urethane
☐	7049	Low Profile Truck
☐	7050	Fluidizing Conveyor
☐	7051	Electric Drive
☐	7052	Vacuum Technology
☐	7053	Automatic Process Control
☐	7054	Material Handling Systems
☐	7055	Pulverizer
☐	7056	Spray Dryers
☐	7057	Conveyor-Dryer
☐	7058	Multiple-Tube Collector
☐	7059	Processing Equipment
☐	7060	Roller Mill
☐	7061	Germanium Rectifier
☐	7062	Prebreaker
☐	7063	Heater-Thermostat
☐	7064	Gas Plants
☐	7065	Homogenizers
☐	7066	Filter Aids
☐	7067	Diatomite Filters
☐	7068a	Heating & Cooling Coils
☐	7068b	Evaporative Condensers
☐	7068c	Cooling Towers
☐	7068d	Air Washers
☐	7069	Blow-Thru Feeder
☐	7070	Vacuum Molding Bags
☐	7071	Magnetic Separator
☐	7072	Vacuum Tube Thickener
☐	7073	Electron Accelerators
☐	7074	Dryers
☐	7075	Continuous Mixer
☐	7076a	Turbine & Paddle-type Top- or Bottom-entering Mixer
☐	7076b	Propeller-type Top-entering Mixer
☐	7076c	Side-entering Mixer
☐	7076d	Mixing Data Sheet
☐	7076e	Portable Mixer
☐	7076f	Condensed Catalog
☐	7076g	Rotary Mechanical Seals
☐	7076h	Laboratory Mixer
☐	7077	Steam & Hot Water Generators
☐	7078	Homogenizer
☐	7079	Wire Conveyor Belt
☐	7080	Diaphragm Pump
☐	7081	Spray Nozzles
☐	7082	Porous Ceramic Filter
☐	7083	Communication System
☐	7084	Demineralizer
☐	7085	Corrosion-proof Pump
☐	7086	Industrial Glove
☐	7087	Ejecto Pump
☐	7088	Eye-wash Fountain
☐	7089	Rotary Steam Tube Dryer
☐	7090	Static Spray
☐	7091	Carboy Boxes
☐	7092	"Saving Old Roofs"
☐	7093a	Gas Mask
☐	7093b	Vision-scope Tests
☐	7094	Coated-fabric Glove
☐	7095	Safety Clothing
☐	7096	Noise Control
☐	7097	Safety Face Shield
☐	7098	Dust Collector
☐	7099	Spray Nozzle
☐	7100	Sulfide Monitor
☐	7101	Fittings
☐	7102	Protective Clothing
☐	7103	Industrial Air Pollution Control
☐	7104	Salt Bath, Heater
☐	7105	Air Sampler
☐	7106	Batch-type Oven
☐	7107a	Signaling Horn
☐	7107b	Liquid-Level Indicator
☐	7108	Hat and Goggle
☐	7109	Totally-enclosed Fan-cooled Motors
☐	7110	Vibrator
☐	7111	Fiber Drums
☐	7112	Polyethylene Liners
☐	7113	Moyno Pump
☐	7114a	Liquid Meter
☐	7114b	Filter
☐	7114c	Blender
☐	7115	Stainless Drum
☐	7116	Polyethylene Liner
☐	7117	Dispensing Balance
☐	7118	Vacuum Packager
☐	7119	Fibre Drum
☐	7120	Shot-Blasted Drum
☐	7121	Code-Dating Machine
☐	7122	Bag Closing Machine
☐	7123	Poly Container
☐	7124	Bulk Container
☐	7125	Checkweight Scales
☐	7126	Silicate Stone Sink
☐	7127	Biochemical Fermenters
☐	7128	Conveyor-belts Heating
☐	7129	Micro-bellows Pump
☐	7130	Carbon & Sulfur Determinator
☐	7131	Muffle Furnace
☐	7132	Laboratory Glassware
☐	7133	Laboratory Presses
☐	7134	Sample Holders
☐	7135a	Dial Thermometer
☐	7135b	Pressure Gage
☐	7135c	Liquid-level Gage
☐	7136	Unitized Stills
☐	7137	Plastic Graduates
☐	7138	X-ray Studies
☐	7139	Teflon Lining
☐	7140	Stainless Fitting
☐	7141a	Tube Cleaners
☐	7141b	Tube Expander
☐	7142	Rigid PVC Pipe
☐	7143	High-pressure Vessel Gasket
☐	7144	Wire Screen
☐	7145	Metal Grating
☐	7146	Packaged Boilers
☐	7147a	Pressure Vessels
☐	7147b	Stacks
☐	7147c	Pipe
☐	7147d	Weldments
☐	7147e	Field Construction
☐	7147f	Steel Plate Products
☐	7147g	Storage Vessel
☐	7148	Nylon Balls
☐	7149a	Vibratory Feeder
☐	7149b	Magnetic Separator
☐	7149c	Magnets
☐	7149d	Pipeline Traps
☐	7150a	Centrifugal Pump
☐	7150b	Acid-handling Pump
☐	7150c	Slurry Pump
☐	7151	Automatic Lubricators
☐	7152	Teflon-asbestos Packing
☐	7153	Flexible Coupling
☐	7154	Welding Couplings
☐	7155a	Positive-displacement Pump
☐	7155b	Duplex-diaphragm Pump
☐	7155c	Plunger Pump
☐	7156	Corrugated Tubing
☐	7157a	Strainer Traps
☐	7157b	Venting Traps
☐	7158	Graphite Lubricant
☐	7159	Sealless Pump
☐	7160	Carbon Dioxide
☐	7161	Metal Filters
☐	7162	Castings
☐	7163	Boiler Water Treatment Equipment
☐	7164	High-temperature Lubricator
☐	7165	Compressed Air
☐	7166a	Dust Control Equipment
☐	7166b	Multi-bag Filter
☐	7167a	Horizontal Plate Filter (state material)
☐	7167b	Renting Pilot Model Filter
☐	7168	Check Valve
☐	7169	Tee-head Bolts
☐	7170	Unions
☐	7171	Centrifugal Pump
☐	7172	Expansion Joints
☐	7173	Batch Centrifugals
☐	7174	Vacuum Filter
☐	7175	Hydraulic Bender
☐	7176	Electrically-heated Gages
☐	7177	Studding Outlets
☐	7178	Rotary Union
☐	7179	Dust Collector
☐	7180	Mobile Air Cooler
☐	7181	Control Valves
☐	7182a	Heat Transfer Equipment
☐	7182b	Process Equipment
☐	7183	Scrubbers
☐	7184	Filter
☐	7185	Refractory Concrete
☐	7186	Porcelain Tower Packing
☐	7187	Water Hammer Shock Absorber
☐	7188	Spray Valve
☐	7189	Industrial Products
☐	7190	Waste Clarifiers
☐	7191	Pipe & Fittings
☐	7192	Anti-seize Thread Compound
☐	7193	Ventilator
☐	7194	Column Shower
☐	7195	Steam Purifiers
☐	7196	Centrifugal Pump
☐	7197	Platinum
☐	7198	Microbiological Corrosion Control
☐	7199	In-Plant Photography
☐	7200	Chemical Motors
☐	7201	Perforated Sheet Material
☐	7202	Steam Trap
☐	7203	Sub-surface Washer
☐	7204	Diaphragm Valve
☐	7205	Valves
☐	7206	Dust Collectors
☐	7207	Heat Exchangers
☐	7208	Polyurethane Limbs
☐	7209	Pipe Benders
☐	7210	Stainless Fitting
☐	7211	Plastic Pipe, Fittings & Valves
☐	7212	Cathodic Protection
☐	7213	Cooling Roll Inserts
☐	7214	Belt Idler
☐	7215	Liquid-Level Gage
☐	7216	Direct Flow Pump
☐	7217	Potassium Cyanide
☐	7218	Designs, Accessories
☐	7219	Diaphragm Valve
☐	7220	Lubricated Plug Valve
☐	7221	Drum Lining
☐	7222	Spectrographic Carbon Rod
☐	7223	Filter
☐	7224	Mixers
☐	7225	Controlled-volume Pump
☐	7226	Flow Meter
☐	7227	Selection of Adhesives
☐	7228	Asbestos Insulation
☐	7229	Automatic Pyrometer
☐	7230	Visual Control Board
☐	7231	Lubricants
☐	7232	Glass Heat Exchangers
☐	7233	Homogenizers
☐	7234	Custom Fabricating
☐	7235	Double Suction Pump
☐	7236	Visible Wedge Valve
☐	7237	Braided Packing
☐	7238	Fuel Oil Additives
☐	7239	Stainless Steel & Alloy
☐	7240	Organic Chemicals
☐	7241	Centrifugal Separators
☐	7242a	Horizontal Pump
☐	7242b	Vertical Pump
☐	7243	Wooden Pallet
☐	7244	Moving Paper
☐	7245	Perfume Oil
☐	7246	Forged Steel Valve
☐	7247	Flush Feeder
☐	7248	Hydraulic Bench Press
☐	7249	Adjustable Speed Drives
☐	7250	Protective Coatings
☐	7251	Activated Carbons
☐	7252	Vinyl Foams
☐	7253a	Storage & Mixing Tank
☐	7253b	Filter Equipment
☐	7254	Frangible Discs
☐	7255a	Silent Check Valve
☐	7255b	Cause, Effect & Control of Water Hammer
☐	7256	Flotation
☐	7257	Clay Conduit Systems
☐	7258a	Plastic Pipe
☐	7258b	Non-metallic Acid Pump
☐	7258c	Plastic Fittings
☐	7258d	Acid Storage Tank
☐	7258e	Rubber & Plastic Comparative Properties
☐	7259	Explosion-proof Motor
☐	7260	Centrifugal Pump
☐	7261	Sludge Collector
☐	7262	Industrial Trucks
☐	7263	Dust Sampler
☐	7264	Pipe Joint Compound
☐	7265	Chlorosulfonated Polyethylene Rubber
☐	7266	Liquid Metering System
☐	7267	Rapid-reversing Motors
☐	7268	Valves
☐	7269a	Valves
☐	7269b	Fittings
☐	7269c	Flanges
☐	7269d	Unions
☐	7270	Canned Motor Pumps
☐	7271	Monolithic Insulation
☐	7272	Low-mw Polyethylene
☐	7273	Het Anhydride
☐	7274	High Pressure Gage
☐	7275	Tube Mills
☐	7276	Metal Fabrication
☐	7277	Welding Couplings
☐	7278	Dust Filter
☐	7279	Manometers
☐	7280	Filter Presses
☐	7281	Pre-mixed Grout
☐	7282	Flooring
☐	7283	Temperature Controller
☐	7284	Industrial Lubricant
☐	7285	Spray Nozzle
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Company ..... **Main Product** .....

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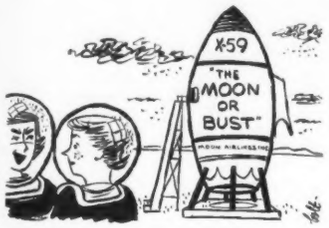
THAT'S INTERESTING

(*Continued from page 2*)

Dust in a hurry

Dust can penetrate solid metal, if it's moving fast enough. In tests performed by the Armour Research Foundation tiny particles, almost invisible to the naked eye, were propelled at speeds up to 4000 fps — fast enough to penetrate a copper plate 0.008" thick.



"Somehow I'd feel better with a different slogan"

These high velocities are used to simulate some of the hazards encountered in space flight. They're achieved by loading dust in firing end of a shock tube, then using expanding gases of shock wave to carry the dust along tube to impinge on a metal plate at the other end. Velocities up to 11,000 fps are possible.

Prospectors attention!

A simple-to-use, inexpensive kit now available, makes possible on-the-spot approximate uranium assay. It can be used as an adjunct to Geiger and scintillation counters or alone in prospecting for uranium ore.

Kit, called Urani-Tector, uses fluorescent property of compounds to detect their presence. Sun's energy excites sample held inside the detector and commercial ore samples are provided for comparison.

Device, developed by two University of Wyoming scientists, is offered by Dept. AS, CMG Industries, Dept. CP, 615 S. 2nd St., Laramie, Wyo. . . . . or for more information check 7299 on form opposite last page.

For more information on product at right, specify 7300 . . . see information request blank opposite last page.

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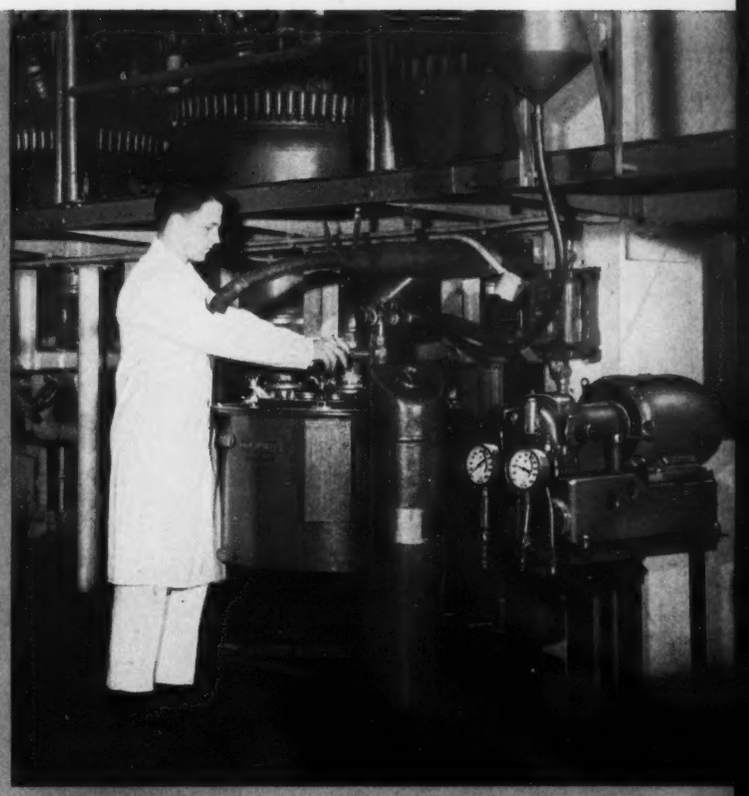

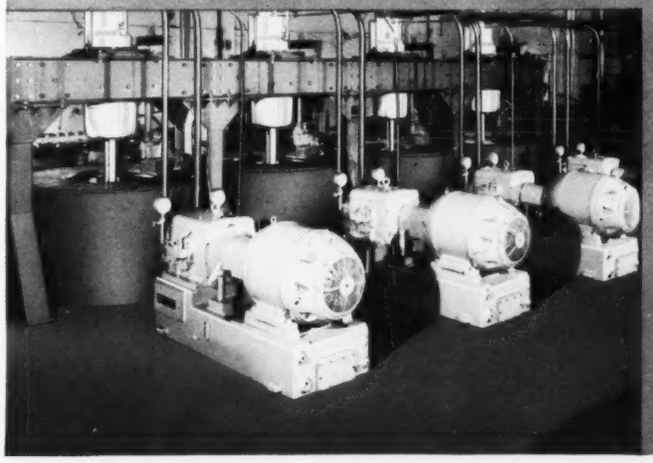

This Centrifuge at Abbott Laboratories

Leading house in pharmaceutical, drug and chemical field, Abbott Laboratories installed first Oilgear Drive on Tolhurst centrifuge in production department. Experience was so satisfactory it led to the inclusion of another Oilgear equipped Tolhurst centrifuge in their experimental laboratories.

SPECIFICATIONS: Speed continuously variable from zero to 1200 rpm max. (in this case). Full control of acceleration/deceleration speed and rate. Permits that infinitely modifiable speed best suited to loading, washing, spinning and unloading.

Photo Courtesy, Chemical Processing Magazine

This Centrifuge at powder plant in east

In a somewhat different application, these 4 Oilgear 60 hp "Any-Speed" Drives serve Tolhurst centrifuges in powder plant in the east. Centrifuge accelerates to 300 rpm for loading, to 900 rpm for 15-minute centrifuging, then decelerates to 70 rpm for "plowing." Unloading is automatic.

Tolhurst is a division of American Machine & Metals, Inc.

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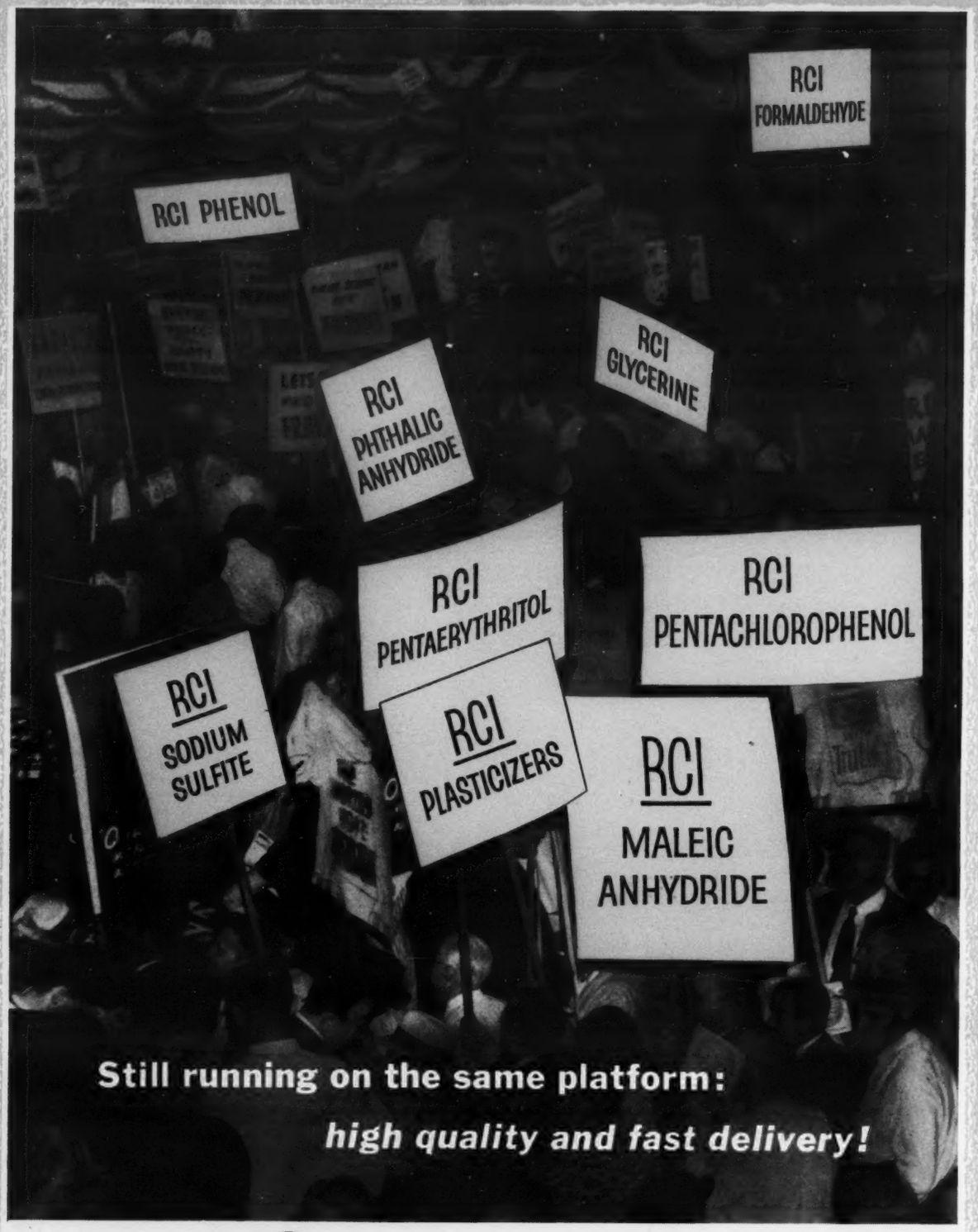

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